Devoted to
TEXTILE
CHEMISTRY
BLEACHING
DYEING
PRINTING
FINISHING

UARY 28, 1946
UME 35, No. 2

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AMERICAN

DYESTUFF REPORTER

OFFICIAL PUBLICATION
of the
PROCEEDINGS
AMERICAN ASSOCIATION
OF TEXTILE CHEMISTS
AND COLORISTS

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Fastness and fashion go hand in hand. Brilliant colors are an inspiration to creative stylists. They serve, too, to answer the demands of the color-hungry public.

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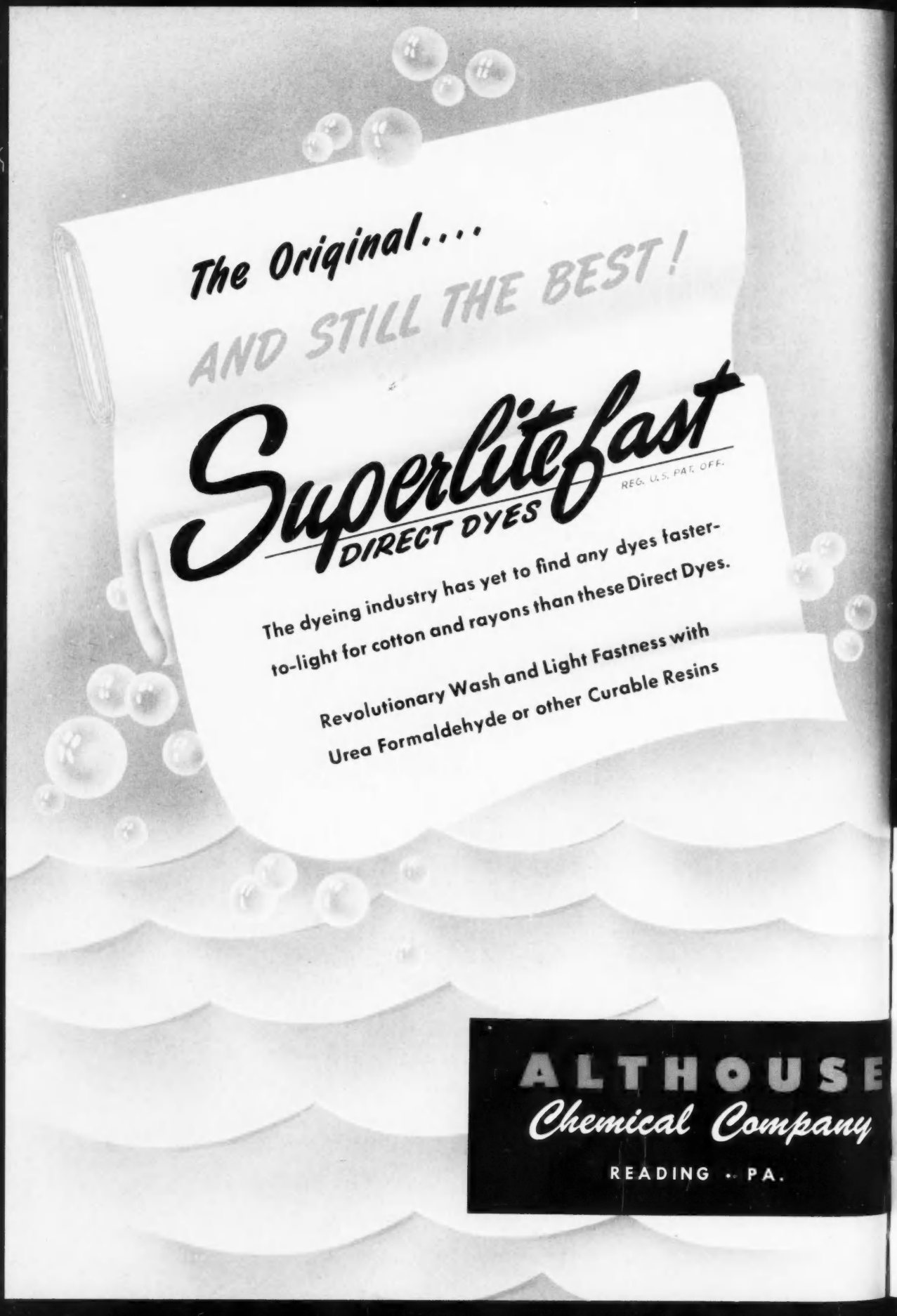
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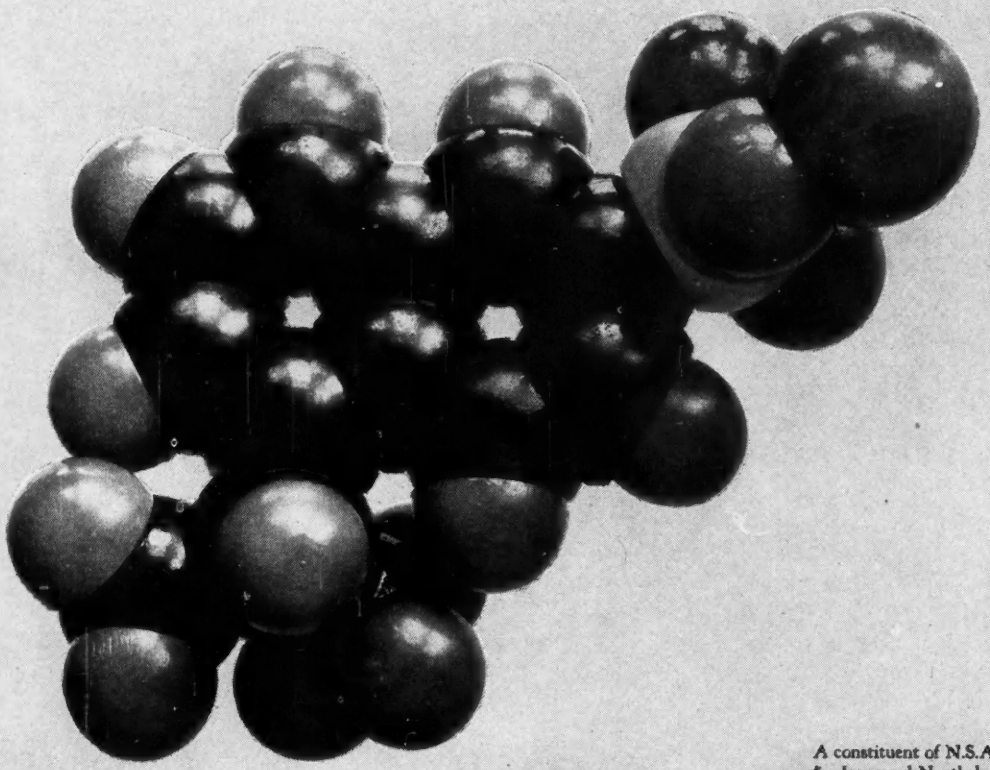

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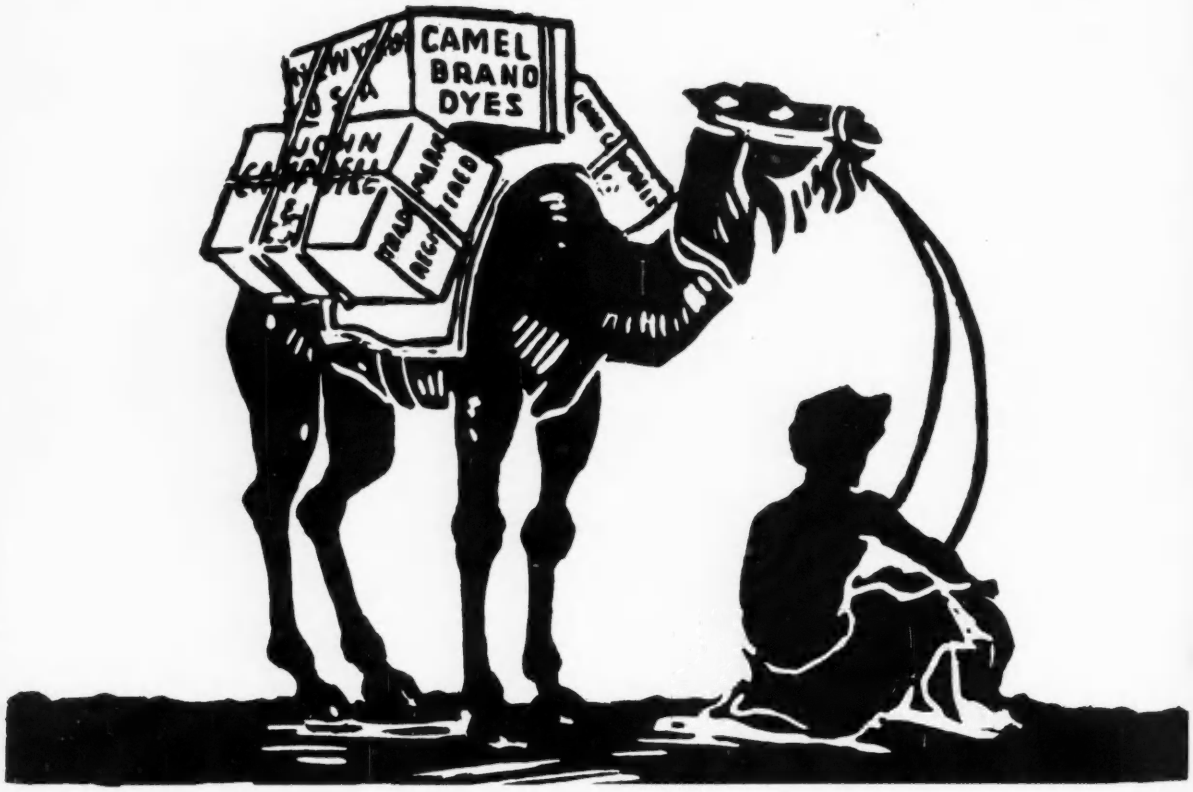

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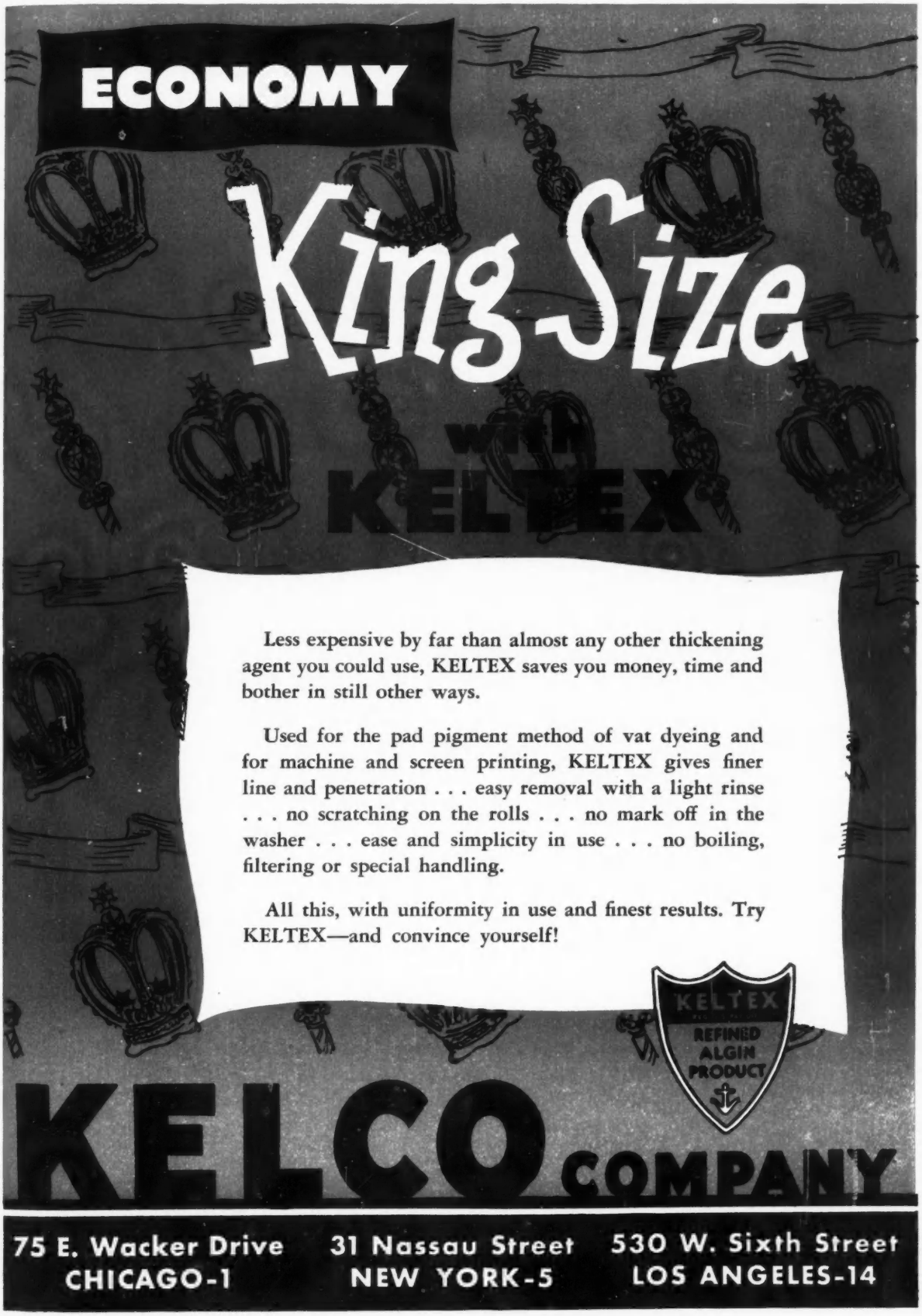
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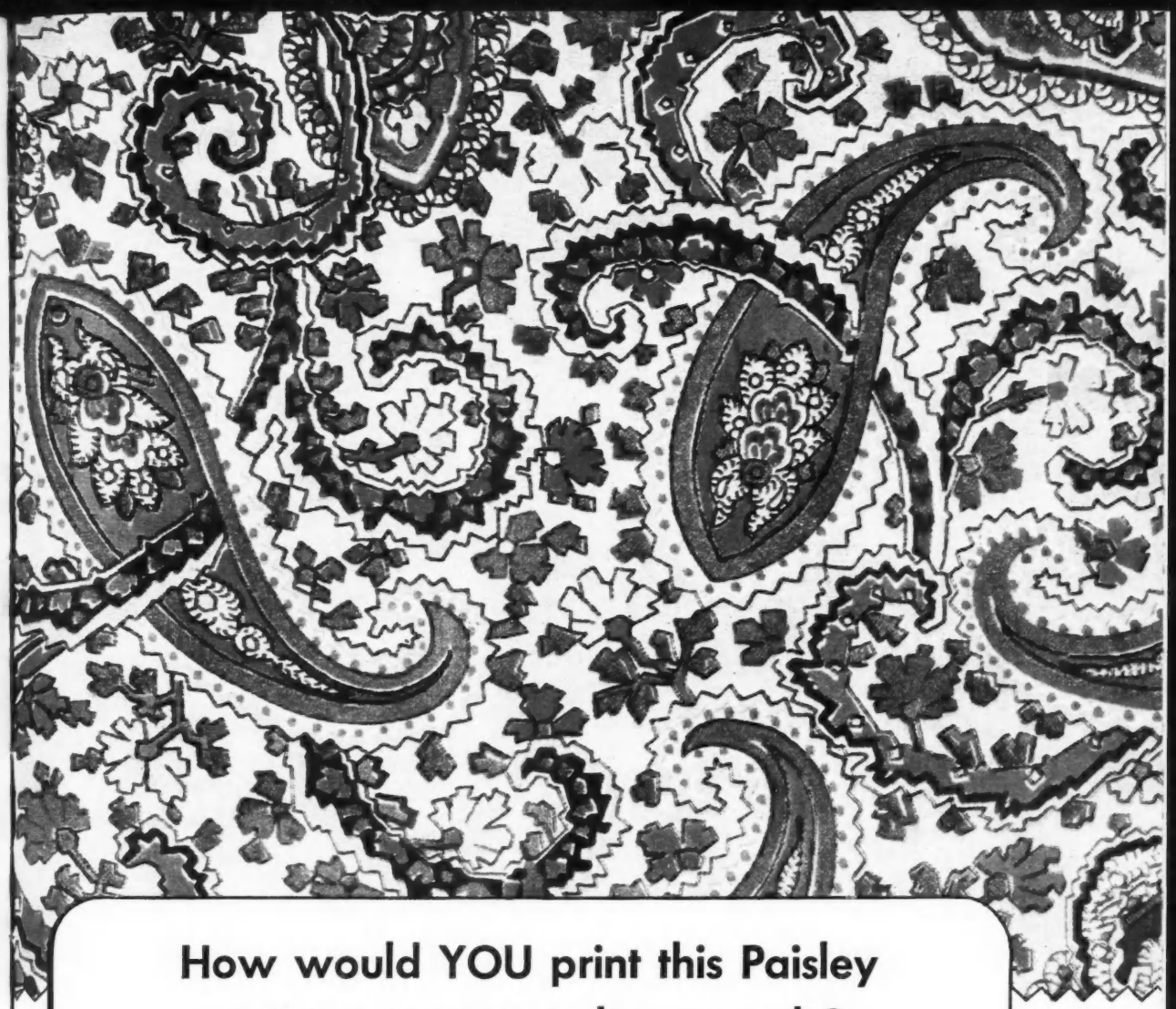

How would YOU print this Paisley pattern on cotton dress goods?

The Pontiac Finishing Plant, of Fruit Of The Loom, Inc., decided that the best and most economical method was to use a combination of Aridye* Pigment Colors and Rapidogen Dyes.

The formulas were as follows:

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NAVY . . . 5 ozs. per gal. Rapidogen Navy blend in starch paste.

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This Paisley pattern is typical of many in which Aridye Pigment Colors can be used either alone or in conjunction with various classes of dyestuffs to achieve color combinations or other effects difficult or impractical to obtain any other way.

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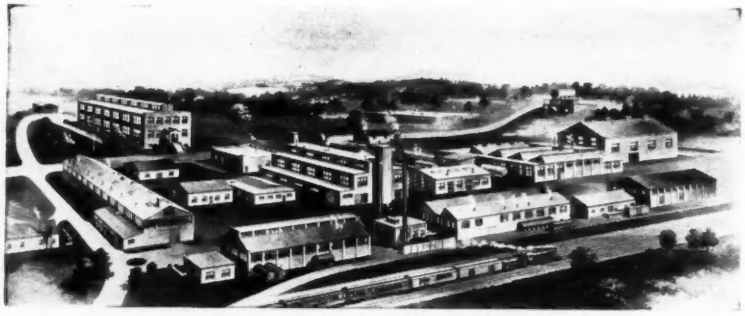

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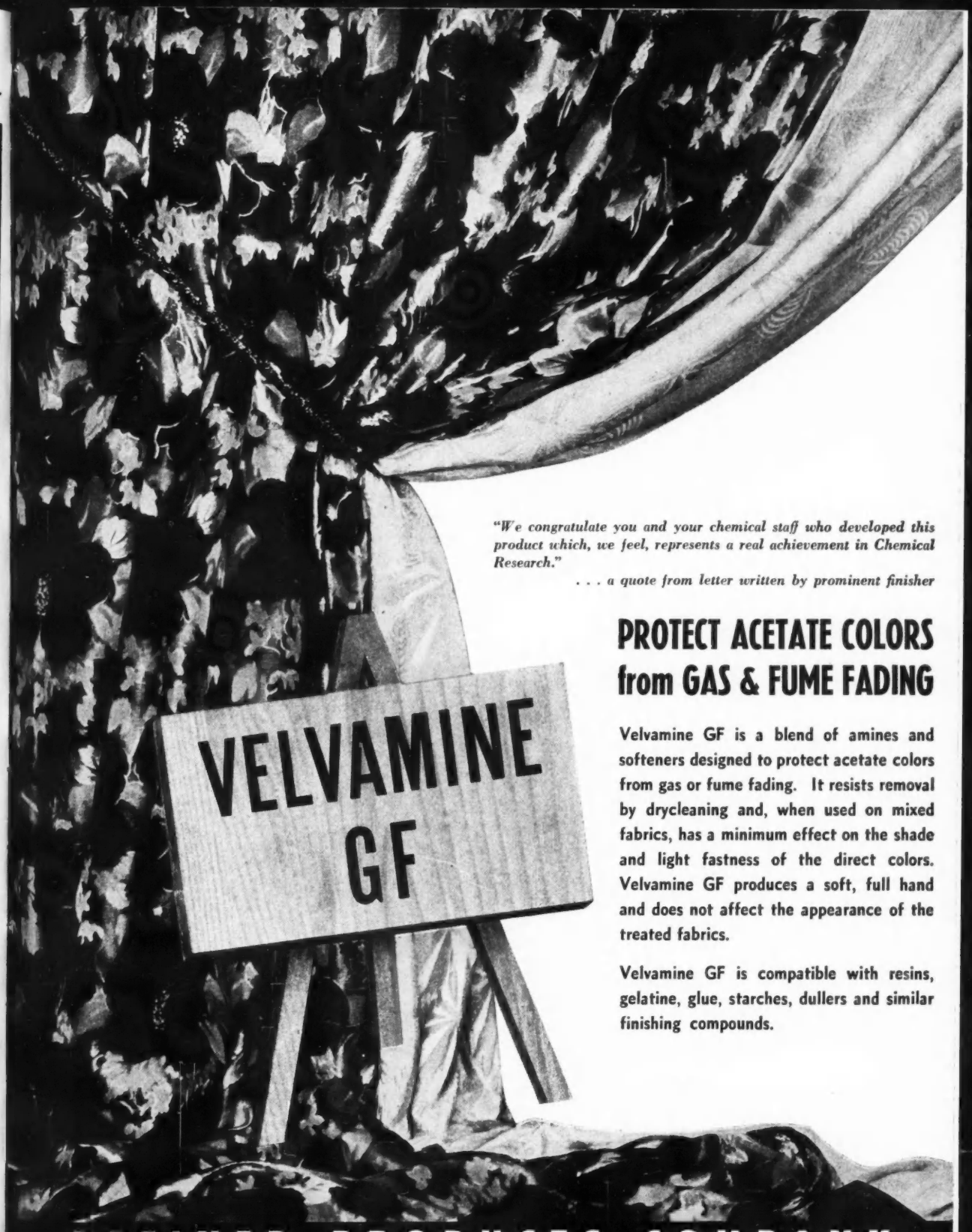

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Sapolene Heavy	25-26	70-75	94% Min.	3-4	2-3%
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Redolene Regular	8-10	92 Max.	95-96%	3-4	3-4%
Redolene Medium	15-18	78-83	96-97%	3-4	3-4%
Redolene Heavy	25-26	70-75	96-97%	3-4	3-4%
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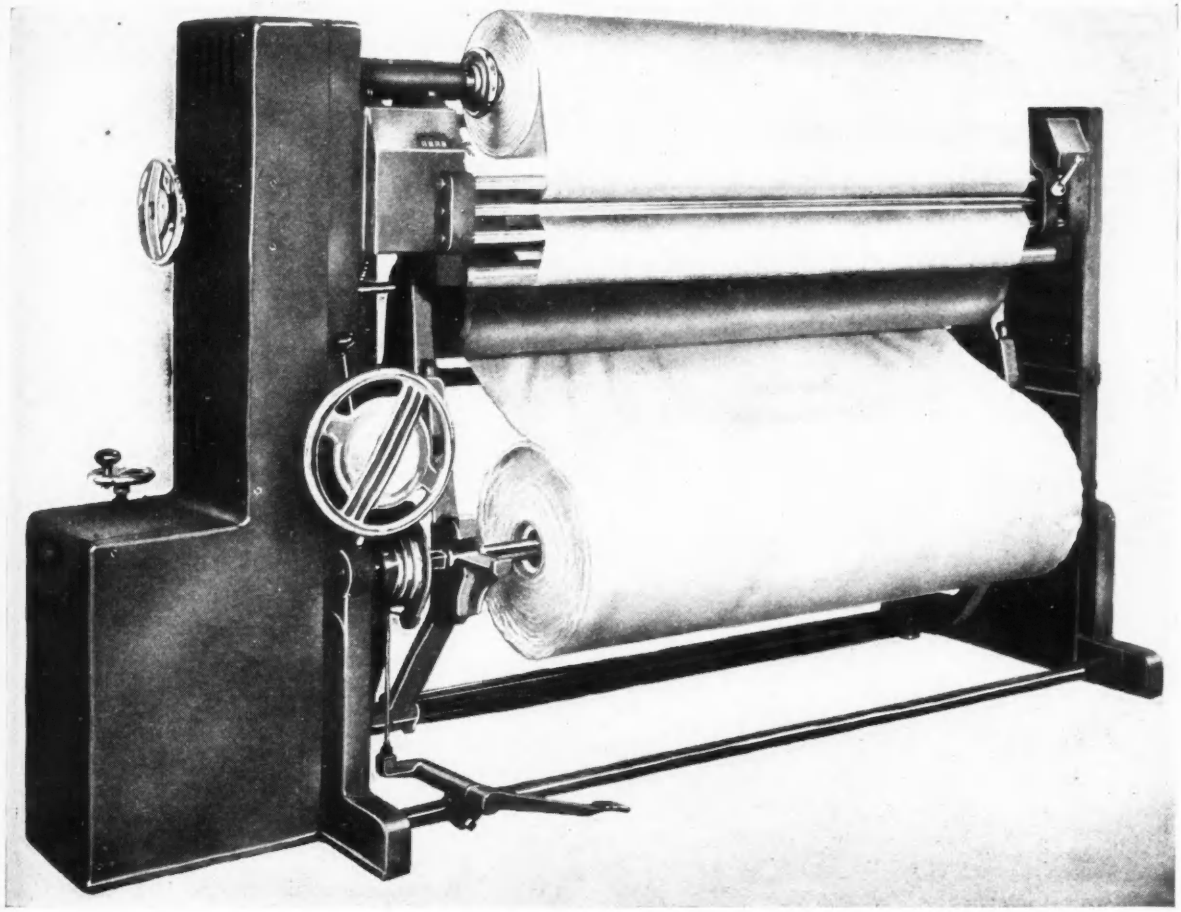

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Softener H produces superior smoothness of hand

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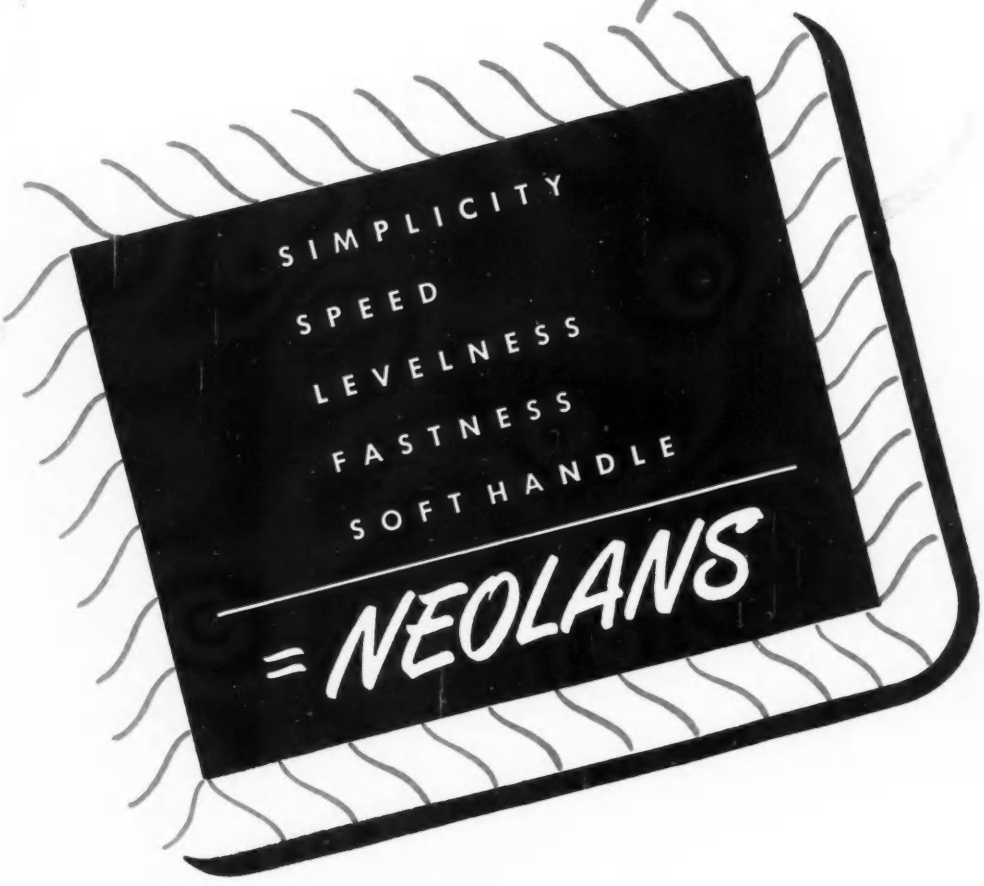

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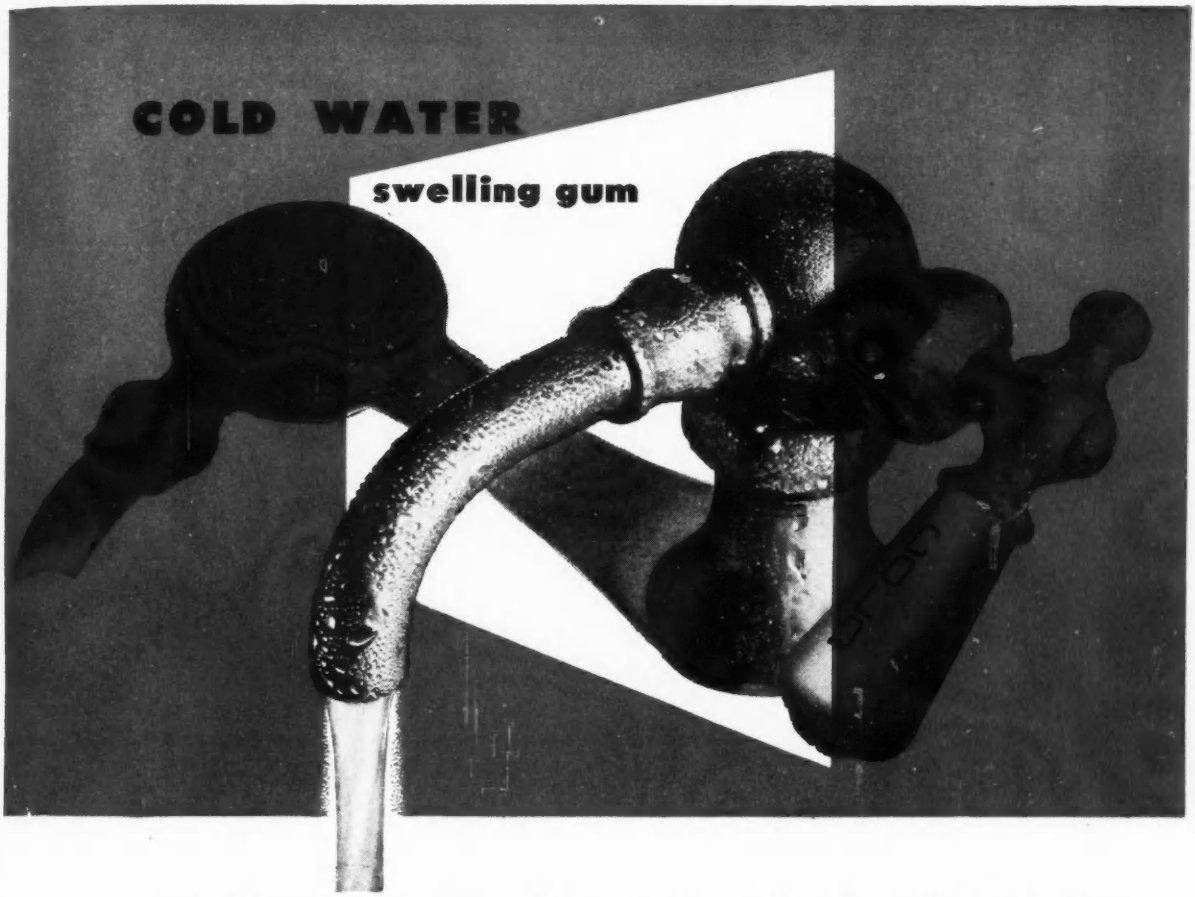

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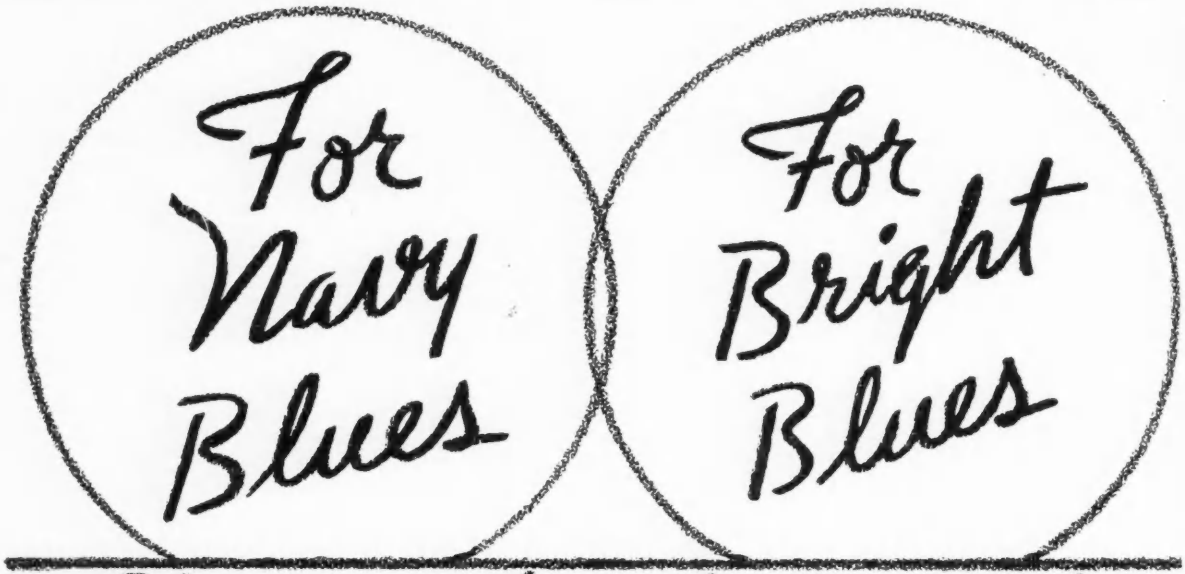

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PHARMASOLS are stabilized solutions, adjusted to the most practical concentration, which can be easily applied with a maximum of efficiency.

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Proceedings of the
American Association of Textile Chemists and Colorists

JANUARY 28, 1946

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Members should notify the Secretary immediately of all address changes

FABRIC EXHIBIT AT THE VICTORY CONVENTION

OVER 1,000 yards of new fabrics were exhibited at the Victory Convention held at the Hotel Pennsylvania, New York. Fabrics were loaned by 22 corporate members of the Association in the first comprehensive show of its type to be staged and sponsored by the organization. The fabrics exhibit was arranged and executed by Glenard Quiette, interior display designer, assisted by Don Sullivan.

In addition to the more than 1,350 members and guests who attended the Convention, an estimated 2,500 persons attended the "open house" viewing of the exhibits which was held on the last day. The scope of the exhibit was unusually large and embraced not only dress fabrics in cotton, wool, rayons and blends, but also linings, upholstery fabrics, drapery fabrics of vinyl film, and Fiberglas, underwear and foundation fabrics, men's and women's suitings, shirtings, ski cloth, rainwear, tablecloths and underwear flannel. Over 95 per cent of the fabrics were washable.

Above—The central figure in the display wears a plaid taffeta of Enka rayon from Redmond Holland. Draped over her head is Slik Spun, a washable rayon fabric by William Lind, of American Viscose rayon. On the saddle of the horse—a new blouse cloth of combed, mercerized cotton and Bemberg rayon by Riverside and Dan River Cotton Mills, Inc.

At left—Draped on the standard from top down: Spunray, a washable rayon and cotton for men's shirts, by Dan River; "Tubmaster" fabric by Meadtex of spun rayon and cotton blend poplin; "Evensong" a rayon dress fabric from Verney Fabrics Corp. On the model, "Breathless" by Renoir, of American Viscose rayon — a "Crown" tested 1.0 denier fabric woven by Ponemah.

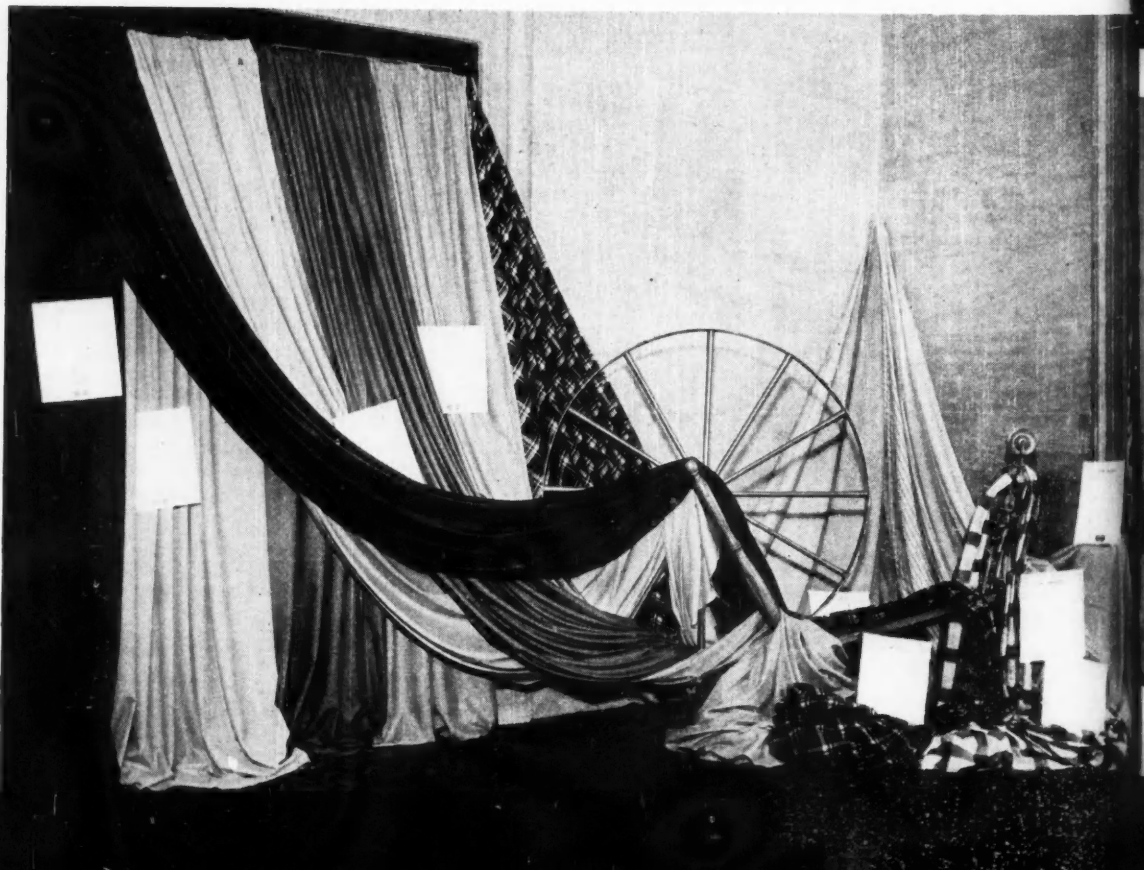
Above, right: Four fabrics for sportswear. Left to right, gabardine of spun rayon and wool, a "Tubmaster" fabric by Meadtex, washable, vat dyed; next, blouse or pajama cloth by A. M. Tenney Associates, all Eastman filament acetate in herringbone twill (not yet available); next, "Lynslub" by Brand & Oppenheimer, a "Crown" tested fabric of 65 per cent Viscose rayon and 35 per cent cotton for men's and women's sportswear; right, Greenfast, by A. Steinam Co., Inc., spun rayon Green Light fabric, "Crown" tested.

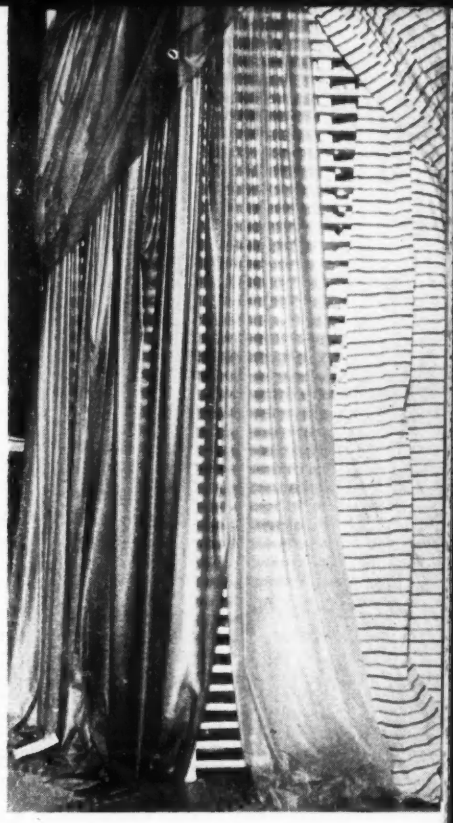
Left — A seal symbolizes the water-repellent fabrics on the table, left to right: Ascolan by A. Steinam Co., Inc.— a new rainwear fabric in "copper"; next, "Jack Frost" ski suiting by Meadtex; and right, two water repellent fabrics by Hirsch-Werner, Inc. in Sandune and royal blue.

Above—On the table at left, Earl-Loom Bur-Mil all acetate rayon satin apparel lining from N. Erlanger, Blumgart & Co., next, Fortisan, by Celanese Corp.—a rayon satin fabric for foundation garment and brassieres; next, Earl-Glo, a viscose rayon 3-leaf twill for men's wear linings, by N. Erlanger, Blumgart & Co. Not showing, an all acetate rayon satin brassiere fabric by Erlanger, Blumgart.

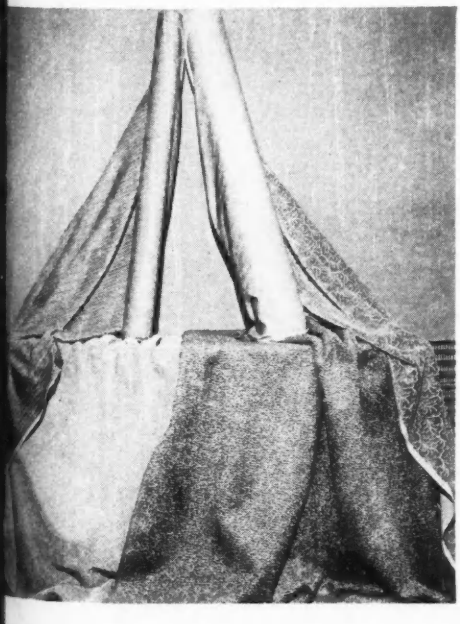
Below—New woolen fabrics: Over the door, six new woolens for dresses and women's suits by the American Woolen Co. in neutrals and jewel tones. To the right of the spinning wheel, three all-wools by S. Stroock & Co., Inc. in billiard green, chartreuse with brown double stripe and pearl grey. Draped over wheel at right, a men's tie fabric in block check of yellow and wine, also by S. Stroock & Co., Inc.

Above—Dark fabric on pole is a filament acetate rayon (Enka) dyed by Cliffside Dyeing Corp. from J. P. Stevens & Co.; next, a William Rose fabric of Enka rayon and acetate; in model's hand, a rayon broadcloth "Tubmaster" fabric by Meadtex; on the model, a Gourdon screen print in Spanish design of Enka rayon.



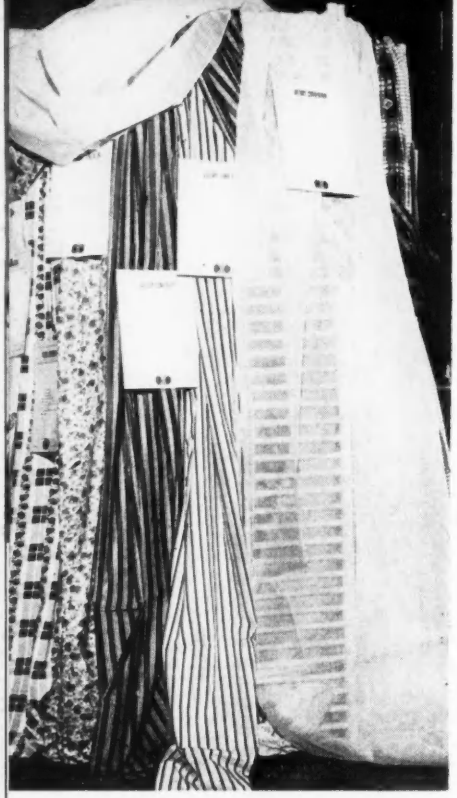


Above—Syntilite, a new vinyl film with texture interest is shown at left of the display. This film, by Plastic Film Corp. can be made in any weight or color. At right, four Fiberglas fabrics from Waverly fabrics, a division of F. Schumacher Co., woven by Duplan Corp. Flock-printed in flame-resistant cotton in polka-dot effect at right is by Velveray Corp.



At left (above)—Draped over the top arm of the form American Viscose "Crown" tested 1.0 denier rayon in the "Spellbound," Belding Heminway Corticelli conversion; next below, turquoise and white "Ch'Intang" pattern from Verney Fabrics Corp.; next below, black and white rayon and acetate shantung (Glen Koda) in Cinderella print by American Bleached Goods Co., Inc. Center and draped to left, "Newsong" in angel pattern by Verney Fabrics Corp.

At left—Four upholstery fabrics by Sidney Blumenthal & Co., Inc. Left, cotton pile fabric with rayon float stripe; next, mohair and worsted pile friese; next, Kurlytex — a curly mohair pile fabric with cotton back; at right, rayon pile fabric cotton back, woven on jacquard loom.

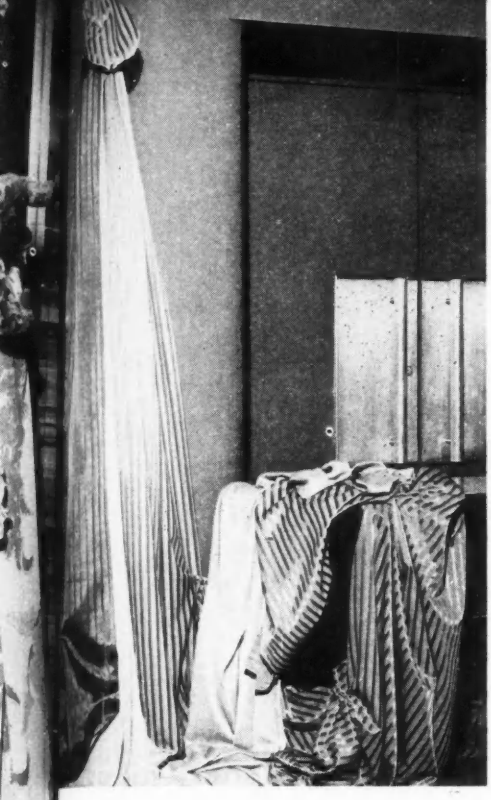


Above—Display of cotton fabrics. Extreme left, Idlease plisse by Pacific Mills, Factag fabric in crysanthemum design; next, Sportease, printed cotton plisse by Pacific Mills, Factag fabric; next, Fleetwood print by Pacific Mills, Sanforized Factag fabric; striped material next, Dantone of combed cotton, vat dyed and Sanforized by Riverside & Dan River Mills, Inc., next stripe—Pacific Mills' Galaprint Sanforized, Factag fabric; next American Bleached Goods Co., Inc. Permalawn, a combed cotton organdie with Saylorized permanent finish; next, not showing, American Bleached Goods' Ballerina, of balloon cloth, Sayl-a-Shrunk in candy stripe; next, plaid Starspun, a Dan River fabric with permanent crisp finish and shrink proof; top right, Century cotton flannel from Rosemary Sales, colorfast to Worth Street rule No. 3, for night wear.

Above—Draped over the form at left is a screen printed Jersanese, in rose pattern against a white ground; center, Alluracel, a rayon crepe print; at right, screen printed Jersanese in large fern pattern. All from Celanese Corporation of America.

Among
fabrics f
ing:
Ameri
Ameri
Ameri
Ameri
Banco
Sidney

Right — Two fabrics from Sea Island Mills, showing color range. Right and left, Element Cloth of long staple combed cotton for outerwear, with durable water repellent finish, vat dyed and Sanforized. Center, Sea Islene, long staple cotton. Rig-mel shrunk, mercerized and vat dyed.



At left—First fabric at left, from J. P. Stevens & Co., upholstery covering, filament rayon warp, 2-ply nylon filling, vat dyed and finished with Mauprif shrunk, durable water repellent finish (Maupai Dyeing Co.); center, Bianchini satin of Enka rayon for women's apparel; right, Verney Fabrics Corp. satin stripe of dull Seraceta and spun rayon blend, 66 2/3 per cent acetate, 33 1/3 per cent viscose, (Fairlawn Finishing Co.)

At right—Fabrics at left and right are by A. M. Tenney Associates, men's and women's wear suiting of kid mohair and Teca (Eastman acetate staple) in a tropical weight twill; center fabric, a suit lining fabric from N. Erlanger, Blumgart & Co., Inc. called Earl-loom—Bur-Mil.

Among the concerns which supplied fabrics for the exhibit were the following:

American Bleached Goods Co., Inc.
American Enka Corp.
American Viscose Corp.
American Woolen Co.
Banco, Inc.
Sidney Blumenthal & Co.

FABRIC EXHIBITORS

Cantor Greenspan Co., Inc.
Celanese Corp. of America
Erlanger Blumgart & Co.
Hirsch-Werner, Inc.
Meadtex Fabrics, Inc.
Owens Corning Fiberglas Co.
(Waverly Fabrics)
Pacific Mills
Plastic Film Corp.

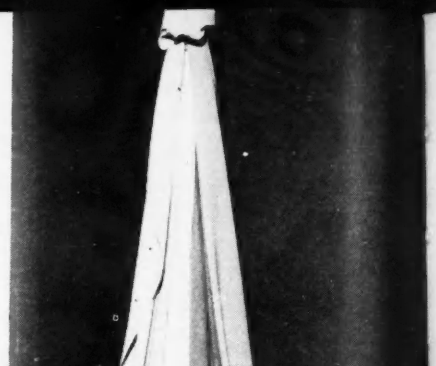
Riverside & Dan River Cotton Mills, Inc.
Rosemary Sales
Sea Island Mills, Inc.
A. Steinam Co., Inc.
J. P. Stevens & Co., Inc.
S. Stroock & Co., Inc.
A. M. Tenney Associates
Verney Fabrics Corp.

At left—Four fabrics of Everglaze chintz shown by Banco, Inc. (Bancroft Proc. Pat.) First left, new lily and rose pattern; next, candy stripe; at right, toile-type pattern; not showing, carnation design.

At right—Three sportswear fabrics: First, striped Mooresville fabric, "Crown" tested of American Viscose; center, check in blend of acetate and viscose, tropical worsted type by Labtex Fabrics, division of Cantor-Greenspan Co., Inc., called "Beaukool"; right, new tartan plaid of American Viscose rayon, "Crown" tested, by H. W. Bauman.

At left—First fabric at left a tablecloth by Rosemary Sales, screen printed on mercerized cotton; center—"Glee," a heavy spun rayon flannel by Verney Fabrics Corp. (Braendly Piece Dye Works). At right, woven striped tablecloth of mercerized cotton from Rosemary Sales.

At right—A "Crown" tested fabric by Meadtex of American Viscose rayon, processed to meet washable requirements for men's sports and dress shirts (left); next, "Janko" spun rayon blend acetate and viscose from Verney Fabrics Corp. (Kenyon Piece Dye Works); darker fabric—Tegra, blend of acetate and viscose in tropical alpaca type, crease-resistant, by Labtex fabrics, a division of Cantor-Greenspan Co., Inc., at right, a suiting fabric, 76 per cent spun rayon and 24 per cent wool, vat dyed, TBL anticrease finish, from J. P. Stevens & Co., Inc. (Bradford Dyeing Assoc.)

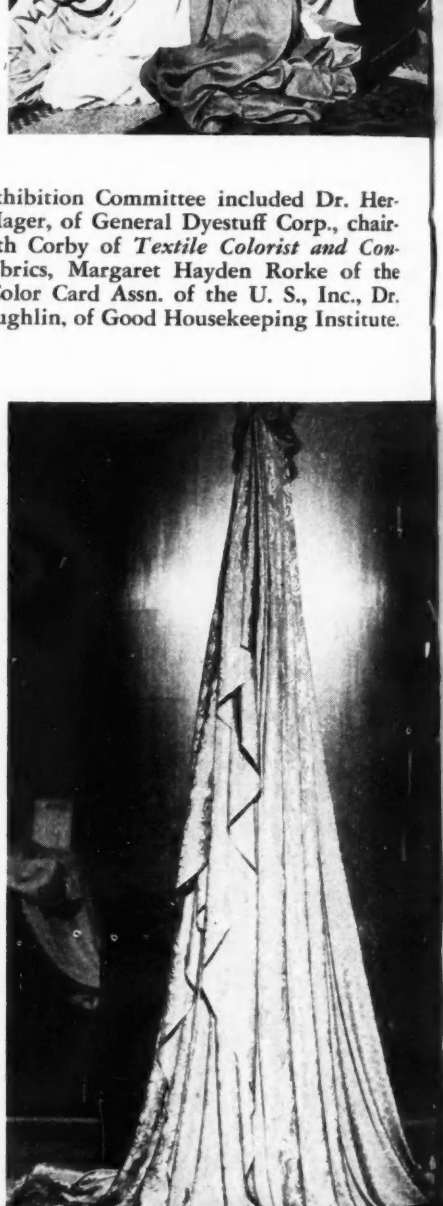


A technical exhibit of the test methods developed by the association, display of captured enemy fabrics by the U. S. Army Quartermaster Corps, and by the U. S. Navy Bureau of Supplies, "window" display of garments by J. C. Penney Co. and a new fiber bonding machine by Kidde, displayed by Riverside & Dan River Cotton Mills, Inc., completed the exhibition.

The Exhibition Committee included Dr. Herman E. Hager, of General Dyestuff Corp., chairman; Ruth Corby of *Textile Colorist and Converter*, fabrics, Margaret Hayden Rorke of the Textile Color Card Assn. of the U. S., Inc., Dr. W. E. Coughlin, of Good Housekeeping Institute.

At right—Three pajama and underwear fabrics of washable rayon. Left, two colors in Da-n-ite "Crown" tested rayon jacquard by A. Steinam & Co., Inc. Both Green Light fabrics. Right, a "Tubmaster" rayon jacquard by Meadtex, vat dyed and Sanforized.

At left—Four sportswear fabrics: Left, American Viscose Corp. sport shirt fabric, 76 per cent rayon, 24 per cent wool, Austinized; next, "Jenesta" from A. Steinam & Co., a Green Light fabric, "Crown" tested; next, "Hawkskin" all-rayon sportswear fabric from Celanese Corp. of America; right, a Labtex fabric of acetate and viscose gabardine.



SOME ASPECTS OF NYLON DYEING*

A. K. SAVILLE

E. I. du Pont de Nemours & Co., Inc.

IN the years immediately prior to the war, considerable quantities of nylon yarn had been produced, the bulk of this production being used by the hosiery industry for the manufacture of nylon men's and ladies' hose, a purpose for which the unique physical properties of nylon were ideally suited. Even before the release of nylon to the trade, considerable work of an exploratory nature had been done; and, during its brief pre-war civilian use, these studies had been continued and now, when nylon is being supplied to the textile trade in ever increasing quantities it is, perhaps, of some interest to review the information obtained and to discuss the efforts of the makers and users of dyestuffs in improving their offerings and recommendations for the dyeing of nylon in its various forms at the present time.

I. ACETATE COLORS

It was recognized at an early date that in the dyeing of ladies' hose, the dispersed acetate rayon dyes gave the most satisfactory results. The dispersed dyestuffs are simple of application and may be dyed on nylon from an aqueous dyebath set with soluble oil, soap, or other dyeing assistants normally used for the dyeing of cellulose acetate rayon. The goods are entered at 100°F., the temperature raised to 180°F. in 15 minutes and the dyeing continued at this temperature for 45 minutes to an hour, a rinse in warm water completing the operation.

From exhaustive studies and comparisons between the dyeing of nylon and acetat rayon with dyes of the dispersed class, it became increasingly apparent that, in general, the properties of the same dye on the two fibers were approximately the same. However, some differences do occur: shade variations between a dyestuff on nylon and the same color on acetate are particularly apparent in the reds and oranges, the shades being considerably duller and bluer than on acetate rayon. In some instances fastness properties, particularly to light, may differ on the two fibers.

The rates of dyeing of acetate colors on nylon and on acetate rayon have been determined, and, it is seen, that while the rate of dyeing at a given temperature is generally a little slower on nylon than the corresponding dye on acetate the general relationship of dyeing rates between these dyes on the two fibers is approximately similar. If combinations of colors are chosen on the basis of good working properties on acetate rayon there should be no difficulty in applying them to nylon, light to medium shades being satisfactorily and levelly dyed in 45-60 minutes' time. In these light and medium shades, the dyebath exhausts to much the same degree on nylon as it does on acetate rayon; as the depth of shade is increased, however, the percentage of color exhausted falls off more rapidly on nylon than on acetate indicating that heavy shades are not as easily built up on nylon as on the latter fiber. Nevertheless, if care is taken to choose colors which build up heavy shades on acetate with facility, no trouble should be encountered in producing all but the heaviest shades on nylon.

While it is important to be able to apply a large amount of color to a fiber and so produce a shade of any desired depth, the reverse property of leveling, or "boiling on and off," in the dyebath is of some practical significance. While this applies particularly to the hosiery trade where seam penetration, level dyeing, and the production of a homogeneous shade throughout the dye lot is of great importance; this property is also valuable in enabling a dyer to correct unlevel dyeings in the conventional methods of dyeing piece goods without having to stop and redye. Although the dispersed dyestuffs show some ability to migrate on acetate rayon, the tendency varies with individuals and is by no means uniform. On nylon, however, the ability of acetate dispersed colors to migrate or level is considerably greater than any color on any other fiber.

To demonstrate the migration properties of acetate colors on nylon and to compare the ability of these colors to "reorient" themselves on the fiber with the reorientation properties of the acid colors on wool, the neutral dyeing colors on silk, and acetate colors on cellulose acetate the following technique was used by Stott as reported in the AMERICAN DYESTUFF REPORTER of December, 1941. An arbitrary shade was approximated on the four fibers as follows:

Wool	*Per cent*
Pontacyl Light Yellow GX	0.20
Pontacyl Carmine 2G	0.15
Du Pont Indigotine Conc.	0.05

Silk	*Per cent*
Du Pont Neutral Yellow GS	0.15
Du Pont Neutral Brown 2RS	0.40
Pontacyl Fast Black N2B	0.15

Cellulose Acetate	*Per cent*
Acetamine Yellow CG	0.40
Acetamine Orange GR	0.25
Celanthrene Violet CB	0.40

Nylon	*Per cent*
Acetamine Yellow CG	0.075
Acetamine Orange GR	0 210
Celanthrene Violet CB	0.175

In addition to these combination dyeings, separate pieces of fiber were dyed with the individual colors in the same proportion as used in the combination dyeings. These were then entered into a dyebath containing the same concentration of dyeing assistants as used for the combination dyeings, and then treated in this bath under the same conditions as the combination dyebath; periodic observations being made to determine the rate and extent of color migration among the three pieces at time intervals of 10, 20, 30 and 60 minutes. If migration occurs, the three pieces will differ in shade. If one color migrates and two do not, its influence on the shade of the third will be apparent, accompanied by a loss in depth of the color. If two colors migrate, and one does not, the influence on each other shade as well as on the shade of the third will be seen. If migration takes place completely, the three pices will be equal in shade and strength and equal to the control dyeing.

From separate baths containing 10 per cent Glauber's salt and 3 per cent acetic acid, three pieces of fabric were dyed with:

	Per cent
Pontacyl Light Yellow GX	0.60
Pontacyl Carmine 2G	0.45
Du Pont Indigotine Conc.	0.15

These colors having been selected as representative colors of the level dyeing acid colors. Kodachrome photographs of these dyeings were taken. These dyeings were then simultaneously entered into a bath of the same composition as the original dyebath, containing the same quantities of Galuber's salt and acetic acid and gently boiled, at given time intervals other Kodachrome photographs were taken of these dyeings.

Ten minutes: All three colors have migrated considerably. The yellow has become yellowish tan; the red has absorbed some blue and yellow and the blue has become brownish grey.

Twenty minutes: The trend is in the same general direction as above but con-

* Presented at meeting, Philadelphia Section, November 30, 1945.

siderably slower.

Thirty minutes: Only very slight changes from the 20-minute test.

Sixty minutes: In each case, some of the original yellow, red and blue is retained. Compared with the control dyeing of the proportions, the original yellow dyeing is appreciably yellower; the original red dyeing is appreciably redder and duller and the original blue dyeing is somewhat bluer and duller.

While this combination can be considered as very good, it is equally obvious that migration has not taken place completely under the conditions of the test.

Neutral Dyeing Acid Colors on Silk

Using the same method to evaluate neutral dyeing acid colors on pure silk migration tests were made on dyeings of:

	Per cent
Du Pont Neutral Yellow GS	0.30
Du Pont Neutral Brown 2RS	1.20
Pontacyl Fast Black N2B	0.45

dyed with 1 per cent soap and 20 per cnt Glauber's salt for one hour at 190-200°F.

Ten minutes: Slight indication of migration of the brown only.

Twenty minutes: The brown continues to migrate slightly to the yellow and black.

Thirty minutes: No important change.

Sixty minutes: No important change.

The tests show that these colors dyed on pure silk do not possess the property of migration to any extent.

Acetate Colors on Cellulose Acetate

Tests were made on cellulose acetate using dyeings made with:

	Per cent
Acetamine Yellow CG	1.2
Acetamine Scarlet B	0.75
Celanthrene Violet CB	1.2

dyed from a bath containing 2 per cent soap, 0.5 per cent "Modinal" D Paste for one hour at 190-200°F.

Ten minutes: No appreciable migration. This yellow has become redder and duller; the scarlet yellower and duller and the violet has changed to a bluish grey.

Twenty minutes: No major change from the 10-minute test, except the violet has absorbed somewhat more yellow and scarlet.

Thirty minutes: No important change.

Sixty minutes: No important change.

The tests show that these colors dyed on cellulose acetate do not possess the property of migration to any extent.

Acetate Colors on Nylon

In a similar manner, the migration of acetate colors on nylon was tested.

	Per cent
Acetamine Yellow CG	0.225
Acetamine Orange GR	0.630
Celanthrene Violet CB	0.525

These were dyed from a bath containing 2 per cent soap, 0.5 per cent "Modinal" D Paste and 1 per cent trisodium phosphate. The results obtained from migration tests made from a bath containing the above quantities of dyeing assistants are:

Ten minutes:

Combination 1: It is at once apparent that all three colors are migrating. The yellow has changed to a yellowish tan; the orange to a brownish red and the violet to reddish grey.

Twenty minutes:

Combination 1: Considerable progress has been made. The yellow has taken up orange and violet; the orange has taken up yellow and violet and the latter has taken up orange and yellow. There is now relatively little difference in tone between the three pieces.

Thirty minutes:

Combination 1: The three pieces are now almost equal in shade to each other, indicating that migration is nearly complete.

Sixty minutes:

Combination 1: As might be expected from the previous test, the three pieces are now almost identically alike in shade and strength and equal to the control dyeing of the original proportions.

A comparison of the acetate color combination on nylon with the acid color combination on wool shows that the selected acid combination on wool, which was chosen for its good leveling properties is somewhat inferior to the acetate combination dyed on ylon. Since these colors can be used with facility for the dyeing of wool, all but the most unlevel dyeings being easily leveled out, it seems reasonable to conclude that this combination can be easily used for the dyeing of nylon. This is emphasized by the fact that during a practical dyeing no conditions as critical as those of the test have to be met, for at no time do the individual colors have to be adsorbed as three separate and individual shades.

It will have been noted that no dyeings of the acid colors on nylon have been shown; these, of course, have been made, but the extent of leveling is so small with any acid colors of interest that under the conditions of the test no noticeable transfer of color among the pieces can be seen.

The fastness properties of the dispersed dyestuffs on nylon differ somewhat from the fastness of the same dyes on acetate rayon, this difference in fastness varying with the individual colors. In general, though, the fastness to light of the acetate colors on nylon is slightly inferior to the same colors on acetate rayon. While, on the whole, colors which are regarded as fast to light on acetate rayon are fast to light on nylon, it is generally true that the colors are of a lower order of fastness on nylon than on cellulose acetate. Presence of titanium dioxide as a delusterant adversely affects the fastness to light of these colors on nylon as it does on acetate rayon, but perhaps to a high degree, a fully delustered nylon fiber being as much as 25 per cent fast to light than a dyeing of similar strength on a bright fiber. The fastness to washing of a given color as determined by three consecutive 10-minute washes at 120°F. in the presence of 0.5 per cent soap is slightly higher on acetate rayon than on nylon, but in all cases a noticeable loss in color occurs under the condition of the test. In other fastness tests such as fastness to water, and to acid or alkaline perspiration substantial agreement between the fastness properties of the colors on nylon and acetate rayon is found.

In one property, however, the fastness between dyed nylon and cellulose acetate differs markedly. When cellulose acetate dyed in blue or violet shades is exposed to gas fumes or stored in the presence of atmospheric oxides of nitrogen pronounced color change occurs, with the development of a pink tone in the dyed material. Using an accelerated test a pronounced color loss may be obtained on acetate in a few hours but, when nylon is subjected to this test, no effect is seen. Under these accelerated conditions a slight effect can be produced on prolonged exposure, but for all practical purposes nylon dyed with acetate blues may be considered gas fume resistant.

Diazo blacks can be applied to nylon in the manner described for direct dyeing types, but if the amount of sodium nitrite and hydrochloric acid normally suggested for the diazotization and development of these colors on acetate rayon is used, reddish black shades are produced indicating insufficient diazotization and incomplete development. Increased time of diazotization effects an improvement, but it has been found that better results are to be obtained by doubling the customary quantities of sodium nitrite and acid employed. After dyeing, the goods are rinsed and diazotized for 30 minutes in a cold bath containing 3 lbs. of sodium nitrite and 7 pints of 32° Twaddle hydrochloric acid per 100 gallons of liquor and, after thorough rinsing, developed in a cold developing bath containing 4-5 per cent of Acetamine Developer AD made slightly acid with acetic acid. The temperature of the bath is slowly raised to 140°F. and development continued for 30 minutes. By this method full shades of blacks with properties similiar to the properties of acetate rayon so dyed are produced.

As is common with most natural and synthetic fibers irregularities in dye affinity exist and it is important that a color cover or effectively mask these dyeing differences if a solid and homogeneous shade throughout the fabric is to be obtained.

Comparisons of the acetate dispersed dyestuffs with colors from all other classes reveal that in this respect they are unequalled in covering nylon yarn of variable affinity. The extensive experience of dyers using dispersed dyes for the coloration of nylon has vindicated the claim that these colors effectively mask fiber to fiber differences and in no case have the acetate colors failed to produce homogeneous shades on nylon for this reason. On the basis of many years practical experience in the dyeing of nylon with acetate as reported from dyers throughout the country, relatively little trouble has been encountered in the application of acetate dyes to nylon. Most of the difficulties which have occurred have been traced to such matters as contamination, physical and mechanical defects of materials and machinery and to a far lesser degree carelessness of operation.

II. ACID COLORS

With the outbreak of war, all nylon yarns were, of course, diverted from civilian hosiery production to military uses. While a large proportion of nylon was allocated to the replacement of silk in parachute canopies and shroud lines and to fulfilling particular needs such as glider tow ropes and bomber tire cord in which fields the undyed yarn was required; some quantity of yarn was available for manufacture into flat fabrics of various kinds for specialized Army clothing uses. In these lines, dyeings made with the acetate dispersed class of colors were not wholly acceptable by the Quartermaster Corps since, almost without exception, nylon fabrics were intended for use in the tropics where intense sunlight followed by leaching with rain rapidly caused pronounced color loss and resultant loss in camouflage properties of the originally olive drab material. Accordingly, the search for nylon dyeings of significantly greater fastness, both to washing and to light than those heretofore obtained with the acetate colors was accelerated, and the efforts of individual dye-makers and users directed and correlated by a Task Committe of the War Production Board.

From a preliminary survey of the dyeing of nylon with all classes of colors by orthodox methods, the acid, direct, and chrome colors showed most promise in providing wet fastness properties far superior to the acetate dyes. Accordingly, the major portion of the work to provide nylon dyeings of superior fastness was done in methods of application and selection of acid colors.

A comparison of the molecular structures of wool with nylon immediately suggests that similarities in dyeing characteristics would be exhibited by the two fibers. Early experiments in the application of acid colors to nylon confirmed this view and indicated that acid dyestuffs were readily absorbed by the nylon fiber to produce attractive shades with desirable fastness properties. Even at the first investigational stages, however, the individuality of the nylon fiber manifested itself in its dyeing behavior with these colors, and called for investigation without prejudice from experience with natural fibers.

While on wool, shades of any desired depth can be easily obtained by normal dyeing techniques, the acid colors on nylon are absorbed only in limited amounts. Light shades can be readily produced with any acid color from standard dyebaths, and as the color concentration is raised increasingly strong shades are obtained but a point is soon reached, usually well before a full shade is obtained, where further color additions have no apparent effect on the shade of the dyed material.

This limiting value for color absorption or saturation point is of particular importance in dyeing nylon since it determines, under a standard set of conditions the maximum quantity of color which can be absorbed and therefore the depth of shade which can be produced with a given color. Accordingly, the saturation points of a number of acid colors on nylon has been determined. The method employed was to make a series of dyeings on nylon in various strength, from a bath containing 5 per cent acetic acid for one hour at the boil. At the completion of the dyeing, spectrophotometric analysis of the usually incompletely exhausted dyebath allowed the quantity of color adsorbed by the nylon to be estimated and from these data the limiting quantity of dye which could be taken up was determined. It will be seen from the table, that in most cases, only a very small quantity of dye is taken up, but, in general, the leveling, or acid dyeing types on wool, have low saturation points on nylon and, will, therefore, only be suitable for the production of medium or light shades, the neutral dyeing colors have, however, a considerably higher saturation point and may find their use in the production of heavy shades such as bottle greens, navys and blacks.

Saturation Point
Acid Colors on Nylon

Color	*Saturation Value at 212°F.*
Pontacyl Crocein Scarlet N Extra.....	1.0
Pontacyl Light Yellow GX.....	1.0
Pontacyl Quinoline Yellow Conc.....	1.3
Pontacyl Violet RL	1.4
DuPont Anthraquinone Green G.....	1.75
DuPont Anthraquinone Rubine R.....	2.25
Pontacyl Fast Blue 5R Conc.....	2.5
DuPont Milling Red SWB Conc.....	3.0
DuPont Anthraquinone Blue SWF.....	3.0

While the addition of acid in excess of the 5-10 per cent acetic acid normally used in these dyeings will increase the saturation points of the colors, it should be stressed that a dyebath acidity which would increase markedly the saturation point, will only be achieved with high concentrations of strong acids which probably will not be encountered in normal dyehouse procedure. The existence of this saturation point definitely limits the amount of color which can be applied, but, up to this value, a color may be used in the production of solid shades with no particular dyeing difficulty.

Seldom, however, will a single color suffice for the matching of a given shade, and shading colors or combinations of many dyestuffs must be used if particular effects and properties are desired. The use of color combinations in this respect reveals a further difficulty encountered in the use of acid colors on nylon; combinations of acid colors are not adsorbed in proportion to their concentration in the dyebath, and the presence of one color, in small amounts, in a mixture may inhibit the dyeing of one or more colors present in much larger amounts. This selective adsorption proved unpredictable and, at the present, combinations must be chosen on a trial and error basis. Extensive studies of the rates of dyeing, saturation points, and the neutral affinity of individual colors revealed that the behavior of a color in respect to these properties when dyed alone bore no relation to its behavior in a mixture.

One further deficiency of the acid colors on nylon is soon apparent. The nylon fiber as produced by melt spinning under low tension is capable of being drawn or extended up to 400 per cent of its original length, and until it has been subjected to this cold drawing process it has no textile properties whatever. This drawing operation converts the originally disordered arrangement of the chain-like molecules to a highly ordered system in which the molecules become aligned parallel to each other and to the fiber axis producing a material of high tensile strength and good elastic properties. It has been found, however, that variations in processing exist, causing differences in yarn denier and differences in orientation or aligment of the molecular structure, which variations are reflected in differences in dye affinity for the acid dyes. It appears that yarns of high draw, i.e., yarns which are extended more than a standard 400 per cent show a low affinity for color while yarns extended less than a standard draw exhibit a high affinity for dye. It is probably true that differnces in chemical composition as well as differences in draw or orientation are reflected in differences in dyeability. In weaving or knitting continuous filament fabrics, yarns of high and low affinity may be adjacent, and during dyeing, differences in amount of color adsorbed by the several threads or yarns occurs. If on nylon, as in the case

of wool, this color could be caused to transfer or boil on and off it is probable that these differences would level out, but such is not the case. Therefore, under any conditions encountered in present practice these differences in affinity are reflected in warp streaks and filling bars in the finished dyeing. Acetate colors which, on nylon exhibit the property of boiling on and off or transfer to a remarkable degree are particularly effective in covering the differences in affinity accentuated by the acid colors.

Pad-Steam Dyeing of Nylon

Dyeing processes normally involve a liquid phase, the color in solution migrating from bath to fiber and dyeing it, if any unlevelness of shade develops during the dyeing the transfer properties of the color will enable most of this unevenness to be corrected by a sufficiently long running time. On nylon, however, this corrective process cannot be employed since the color does not, under normal conditions, boil on and off and the color must therefore be applied levelly in the first instance.

To apply the color in a level manner in the first instance and follow this even pigmentation by some treatment which will cause the color to dye the fiber in situ without the use of a liquid bath, several novel techniques were devised, one of which was the Pad-Steam process. It is realized this process is not ideally suited for nylon dyeing, but it did provide a method for the coloration of nylon in fast to light and washing shades. If the desired color, or combination of colors, could be applied uniformly to the fabric surface and then treated in such a way that no migration of color from fiber to fiber could occur but only migration of color from fiber surface to the interior, level dyeings with minimum of barré would be produced. By a conventional padding operation using a pad liquor made alkaline with ammonia, acid colors can be uniformly and evenly distributed over and through the fabric. Padding of the impregnated fabric which is followed by a steaming, so controlled as to permit even heating of both sides of the material fulfills these conditions by causing color migration into the individual, impregnated filaments of nylon which make up the fabric. With acid colors an acid development bath may be used while metallizable colors may be chromed in the normal manner to produce a true shade.

Considerable care must be taken if a satisfactory dyeing is to be produced. Complete freedom from oils, sizes, and dirt must be ensured or uneven padding and therefore uneven dyeings will result. In addition, any dirt left on the fabric after scouring will migrate into the fiber during steaming and be impossible to remove. The well-scoured, dried goods are padded in the presence of an alkaline dispersing agent which keeps the colors in solution and permits rapid wetting out of the material. The wet padded fabric containing color mechanically adsorbed is easily marked when handled or brought in contact with stationary objects, the mark thus produced persisting throughout all subsequent stages of the operation, and care must be exercised in the handling of the impregnated piece until it is dried, when it may be handled without danger of marking unless brought into contact with a wet object. Dependent on the weight and construction of the goods is the time of steaming which follows the padding operation. Light weight material, up to 3 oz./yd.^{2} can be satisfactorily treated in a vat print ager by ten minutes steam contact, heavy materials needing a considerably longer period for color fixation, for instance, a 14-ounce fabric will require up to 30 minutes vat ager steaming. During ageing, as during all dyeing operations, the goods should be held in open width form and all possible precautions taken to prevent scrimping since such creases easily become permanently fixed in the fabric.

Some objections are present in the process. Great care must be taken in all steps to prevent marking off, water spotting and scrimp formation, and matching shades is not easy; the dyeings produced, however, are of the highest quality and are equal or superior to those produced by any other method.

Jig Dyeing of Nylon

In general, acid dyes are applied to nylon from a dyebath acidified with 5-10 per cent acetic or formic acid on the weight of the goods at a bath temperature of 190°F.; the use of Glauber's salt as a dyeing assistant has no effect, neither promoting leveling of the color nor increasing the exhaustion of the dyebath and therefore may be omitted. For conventional dyeing of nylon, the jig is the only machine which can be successfully used, since goods are held open width and consequently the danger of scrimps and undesirable creases being formed in the material is at a minimum. When dyeing nylon in this manner with dispersed acetate colors, no particular problems are encountered and, provided some care in dyestuff selection from experience with acetate rayon is exercised, end to end, or selvedge to center shading does not arise. When dyeing nylon piece goods on the jig, with acid colors, certain differences in contrast to the fiber do arise. Even if the jig liquor is kept at the boil the low water adsorption of nylon does not allow a high temperature to be reached on the batching roll. This temperature difference between bath and roll has not been accurately measured, but it is of the order of 30-35°F. which means from a boiling bath the effective dyeing temperature in the jig roll may be as low at 180°F. at which temperature only very light shades can be produced. Accordingly, the dyeing of the fabric with acid does not take place on the batching rolls as is normal but only when the fabric passes through the hot jig liquor. Therefore, exhaustion of color and build up of a shade is a particularly long operation taking an excessive time. Also, because of the low water adsorption the ends of the jig roll cool more rapidly than the center and unless great care is exercised objectionable light selvedges are produced.

Under practical conditions, the rate of dyeing and saturation points can be increased only by raising the temperature of the dyebath or by increasing the amount of acid added to the dyebath. Damage to nylon by prolonged treatment with mineral acids and the prohibitive costs of dyeing in concentrated solutions of organic acids such as formic severely limit the increase in the dyeability of nylon to be obtained by increasing the acid content of the jig bath and consideration must, therefore, be given to methods of effectively increasing the dyeing temperature.

The conventional enclosed dyeing machinery such as a winch which would permit temperatures near the boil to be realized, is not suitable for dyeing nylon since the goods must be processed at full width or creases which are practically impossible to remove result. For this purpose, the enclosed jig is the only dyeing machine at present available. In a closed jig the dyebath temperature can be kept at the boil if heating is done by an enclosed steam coil while the temperature above the bath is maintained at or near 212° F. by an open steam inlet near the jig rolls. In a dyeing apparatus of this nature, considerably greater depths of dyeings can be produced over a standard jig, the color combinations used appear to exhibit less selective adsorption, and the difficulties of light selvedges and selvedge to center shading producd by the fabric at the edges of the jig roll cooling more rapidly than that in the center, does not occur. While this method is more cumbersome and more trying on the jig operator than an open jig the results obtained are a great deal more satisfactory.

No close parallel appears to exist between the fastness to washing of acid colors on nylon and on wool but in a majority of cases the fastness of these colors on nylon is appreciably greater than the same colors on wool. Normal wash test procedures have so little effect on nylon dyed with acid colors that, for the assess-

ment of the wash fastness these dyes a new washing test involving two consecutive 30-minute washes at 180°F. in the presence of 0.5 per cent soap and 0.2 per cent soda ash was adopted. In many instances almost complete removal of the color on wool is effected by this washing procedure while the color on nylon is not affected.

It has been mentioned earlier in the discussion of the dyeing with acid colors that one great difference between the acid and acetate classes of dyestuffs lies in the inability of acid colors to level or redistribute on the nylon fiber. For this reason, it is essential that the initial application be level, consequently, the dyeing conditions should be chosen as to favor slow and even adsorption of dyestuff by the fiber. Failure to observe these conditions will necessitate the use of remedial measures and in the case of acid dyestuffs they are few in number and partial in degree.

The use of stripping agents, either caustic and hydro, Sulfoxite S, and acid, or Glauber's salt have little or no effect on the acid colors on nylon and at the present time the stripping of the majority of acid colors on nylon is not a practical proposition.

III. VAT COLORS

While the major portion of the experimental work concerned with producing dyeings of improved fastness on nylon has been directed to methods of selection and application of the acid colors, other classes of colors which produce particular fastness properties, have been studied.

Of paramount importance in producing dyeings with maximum fastness to light and washing on cotton and other cellulosic fibers, are the vat colors, and the property evaluation of these colors on nylon was soon thoroughly covered. In general the vat colors, when applied to nylon by methods commonly used in the dyeing of cotton or rayon, exhibit indifferent affinity. In few cases can full or heavy shades be produced by dyeing at temperatures around 140°F. in the presence of caustic soda and hydrosulfite, and the weak shades so produced while of excellent washing fastness, have poor rubbing fastness. Mainly on the basis of this poor fastness to crocking and washing, it was predicted that the vat colors would find little place in the nylon dyeing picture. However, in the course of further experimentation the affinity of nylon for these colors was found to be considerably improved if the dyeing temperature were raised from the normal 140°-150°F. to 190°-212°F., Sulfoxite C being used as a reducing agent in place of hydrosulfite which is unstable at this high temperature. Under these conditions considerably heavier shades than have been heretofore obtained by conventional methods were produced and these dyeings are considerably faster to crocking. While the vat colors can be successfully applied to nylon by a high temperature dyeing in shades very fast to washing, other wet processing and to crocking, the fastness to light of these colors is particularly disappointing. In the course of testing the entire line of Du Pont vat colors, it was found that many were badly faded in 10 to 30 hours Fade-Ometer exposure and no individual dyestuff is unaffected after 100 hours exposure.

In the course of extensive light fastness evaluation anomalies have been seen between the light fastness measured by the Fade-Ometer as against normal sunlight. While this study has not yet been completed, it is possible that the vat colors will show a higher resistance to sunlight than would be suggested by Fade-Ometer exposure.

In the entire range of reds, yellows, and oranges tested only Ponsol Golden Orange 4G Paste resists even a 32-hour Fade-Ometer exposure without being as badly faded as to be of little value and this so depletes the line as to make shade matching over a comprehensive range impossible. Among the best colors in respect to light fastness are the Ponsol Blues BCS, BF, GD and RS and the Ponsol Jade Greens, which in self shades of 3 per cent, will resist a 100-hour exposure with only a noticeable to appreciable loss in strength.

While in some instances dyeings exceptionally fast to washing are required with no light fastness specification it would be desirable to have the vat colors on nylon with at least a slightly higher degree of light fastness. It has been found that the light fastness of these colors can, in fact, be markedly increased by aftertreatment of the dyeing.

On the assumption that the reason for rapid fading of vat colors on nylon was due to poor penetration of the fiber with oxidizing agents incomplete oxidation of the applied color being effected, a variety of oxidizing agents and methods of oxidation were assessed, but under normal conditions of temperature and pressure no improvement in the light fastness was noted. However, if the dyeing, made by the standard method and oxidized by normal procedure, for instance by a chrome and acetic acid rinse, were to be cottage steamed at elevated pressures, a marked increase in fastness was obtained. These dyeings, of good light fastness, but of poor fastness to crocking, when examined under the microscope were found to have a major portion of the color on the fiber surface in the form of gross aggregates of vat pigment. Dyeings not so treated were uniformly and homogeneously impregnated throughout the fiber cross-section. By varying the cottage steamer treatment from say five minutes at ten pounds pressure to 60 minutes at 30 pounds pressure, the degree of migration of color to the fiber surface from fiber interior could be varied, the light fastness increasing in proportion to this migration and reaching a maximum when all the color was present on the surface of the nylon. It is suggested that this improvement in light fastness is due solely to a swelling of the nylon fiber, permitting the crystalline growth of pigment particles which because of their large size are less affected by the light. Cotton, when soaped at the boil after dyeing with vat colors is known to become markedly more color fast, and it is probable that this aggregation is prevented on nylon by the highly crystalline nature of the fiber not permitting this aggregation to occur. Only at the high temperature of steam under pressure does sufficient swelling occur to permit this aggregation. In this respect, the use of steam is not specific, other swelling agents for nylon among them p-nitrophenol, may be used either in the chrome-acetic oxidizing bath or as an aftertreatment to produce similar effects. No particular value is seen, however, in this type of aftertreatment, since while the light and washing fastness of the colors so dyed is excellent, the very poor rubbing fastness of the dyeings and the cumbersome aftertreatment required is most unsatisfactory. Work is continuing and it is hoped that the use of the vat colors for other purposes than very fast to washing colors in light shades will be possible in the near future.

IV. AZOIC COLORS

Second only in fastness to the vat colors on cotton is the fastness of the azoic dyes. The application of azoic dyes to nylon dates back several years before the war, but all existing methods for dyeing with these colors proved unsatisfactory in respect to the tinctorial strength obtained, consistency of dyeing, and the fastness properties of the dyeings produced. Interest in these colors was, however, revived in the search for faster colors on nylon. The early methods for dyeing nylon with the azoics was a one-bath process and consisted essentially of dyeing in an aqueous bath containing a naphthanil, previously dissolved with the aid of alcohol and caustic soda, a suitable base and sodium nitrite. After dyeing had progressed for 45 minutes at 140-°-150°F. formic or hydrochloric acid was added to the bath which caused immediate diazotization and coupling of the pigment components to take place. This method did not prove satisfactory. Nylon fibers dyed by this man-

(Continued on page P58)

SOME ASPECTS OF COLOR*

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LAST year the members of your Intersectional Contest Committee found considerable satisfaction in saying in their paper "In some cases the color is there but you do not see it." Tonight I would like to adopt another viewpoint—that is, in some cases you see the color but it is not there. That is, under certain circumstances, dyed goods have a depth of shade much greater than is indicated by the amount of dyestuff present.

It has long been known that when mercerized and unmercerized goods are dyed under the same conditions, the mercerized goods are considerably darker in shade. The generally accepted theory is that mercerizing in some way affects the fiber so that it has more affinity for dyestuff. This explanation seemed very reasonable, but in doing some war work, the results obtained indicated that this theory was not correct, so experiments were made in an effort to prove or disprove it. In order to keep variables at a minimum, a piece of grey goods was put through a regular plant kier boiling and bleaching process. This insured uniformity as far as grade of cotton, construction of cloth and preliminary processing was concerned. This piece was then cut into two pieces of equal length, and one piece was mercerized.

In dyeing it was desirous to select a dyestuff which would permit ready chemical analysis to determine the amount present. Such a color is Ciba Blue 2BD—tetrabromindigo which contains 55% bromine so that measuring the amount of bromine on dyed cloth would indicate the amount of dyestuff it contained.

All dyeings were made with Ciba Blue 2BD Double Paste and figures for percentage of tetrabromindigo and equivalent dyeing are in terms of double paste and not of dry powder.

Equal amounts of the mercerized and unmercerized cloth were placed together in the same beaker and dyed with Ciba Blue 2BD according to standard laboratory procedure. The two samples were then oxidized, washed and dried together. As was to be expected, the mercerized sample was considerably heavier in shade than the unmercerized one, and, under these conditions, if the mercerized cloth had more affinity for dyesutff, it had the opportunity to absorb more at the expense of the sample which was not mercerized. Chemical analyses were made on each sample to determine the amount of tetrabromindigo, figured as 20% paste, on each. Spectrophotometric charts were made on each sample and the following properties measured:

r—reflectance of a single layer.
R—reflectance of multiple layers which is also Y—Spectrophotometric Brightness.
t—transmittance of a single layer.
a—absorption [a = 100 — (r + t)]

Last year the Intersectional Contest Committee determined that for dyeings with Ciba Blue 2BD the following equation applied to photometric determinations:

$$\frac{Y}{10} = \left(\frac{6}{D}\right)^{.625}$$

where Y is the spectrophotometric brightness and D is the percentage dyeing. Using this formula with the value of Y obtained on the dyed mercerized and unmercerized samples, the equivalent percentage dyeing was calculated. The results were:

	r	R
	%	%
Unmercerized Sample	19.7	19.9
Mercerized Sample	14.4	14.4

From these figures it is seen that the ratio of color actually present is 100:112.5 but the ratio of depth of shade is 100:167.5 so the increase in depth of shade is not explained by increased affinity for dyestuff.

The experiment was repeated on a plant scale. The mercerized and unmercerized pieces were sewed together and dyed with Ciba Blue 2BD by padding on the pigment then reducing, oxidizing and soaping on the jig. The unmercerized piece was then cut in half and one half was mercerized after dyeing. Now we had three pieces which were dyed at the same time; unmercerized, mercerized after dyeing and mercerized before dyeing.

The same chemical analyses and spectrophotometric determinations were made on each of the three samples with the following results:

	r	R	a	t	% Tetrabromindigo Present	% Equivalent Dyeing
	%	%	%	%	%	%
Not Mercerized	4.70	4.70	92.07	3.23	16.3	20.0
Merc. after dyeing.....	4.02	4.02	89.07	6.91	16.5	25.8
Merc. before dyeing.....	2.83	2.83	91.56	5.61	17.8	45.4

Here again we see that the differences in depth of shade are much greater than the differences in the amount of color present, and certainly in the case of the portion mercerized after dyeing there can be no question of the affinity for dyestuff.

Although these tests indicate that the theory of increased affinity for dyestuff does not explain the increased depth of shade, we should not simply attempt to discredit it without attempting to offer some other explanation.

Another explanation came to mind, and in order to consider it we should have an elementary discussion of optical effects. When light falls upon an object three things may happen to it; it may be reflected, absorbed or transmitted. The less light reflected from a surface the darker it appears. A pure white reflects 100% of the light at all wave lengths, and a pure black reflects 0% of the light at all wave lengths and absorbs 100%. Therefore, in considering cloth for instance, if we do anything to it which causes it to transmit or absorb more light, it will automatically reflect less light, as the sum of the light transmitted, absorbed and reflected equals 100%. All we see is that portion of the light which is reflected, and it is by that reflected light that we determine color and depth of shade.

a	t	% Tetrabromindigo Present	% Equivalent Dyeing
%	%	%	%
73.6	6.7	1.45	1.99
74.1	11.8	1.65	3.35

Here we have a number of pieces of cloth, each of which has been dyed with an increasing amount of dyestuff. They look progressively darker as they have on them increasing amounts of dyestuff so that there is an increasing amount of light absorbed, therefore, decreasing amounts of light reflected.

In considering the depth of shade of mercerized goods compared to unmer-

* Presented at meeting, Rhode Island Section, October 26, 1945.

terized goods, we have shown that there is not enough additional dyestuff present to account for the increase in depth of shade, so it was considered it might be due to a change in the optical properties of the cloth, and the foregoing mentioned figures show increases in the amount of light transmitted on the dyed mercerized samples. If the differences in depth of shade on the dyed goods are due to a change in the amount of light transmitted due to mercerizing, then undyed cloth should show similar differences. In order to check this point, spectrophotometric charts were made on the unmercerized and mercerized cloth before dyeing. The results were as follows:

	r	*R*	*a*	*t*
	%	%	%	%
Undyed unmercerized cloth	63.9	87.7	0.6	35.5
Undyed mercerized cloth	57.0	84.8	0.2	43.2

From these figures it is seen that both the single layer and multiple layer reflectance is less and the transmittance is more on the mercerized than on the unmercerized cloth.

This difference in optical properties between mercerized and unmercerized cloth seems, therefore, to explain in part the variations in depth of shade, but that it is not the entire story is evident by consideration of the figures on the dyed samples. It appears logical to assume that the difference obtained by mercerizing after dyeing is due to optical properties, but here the ratio of depths of shade is 100:129, whereas the differences of depths of shade when the goods were mercerized before dyeing, were in the ratio of 100:167.5 and 100.227. Evidently we have found only part of the answer.

Another possibility suggested itself which was the question of penetration. Accordingly, photo - micrographs were made of cross sections of the laboratory dyed and plant dyed samples. Here they are and you can see that with the two unmercerized samples and the sample mercerized after dyeing there is complete penetration of the color into the fiber. With the samples which were mercerized before dyeing, there is practically no penetration into the fiber and the color is on the surface. The differences in the ratios of mercerized and unmercerized between the laboratory and plant dyeings are probably explained by the fact that the plant dyeing was under tension and, therefore, resistance to penetration increased.

From the foregoing there appear to be three reasons for dyed mercerized goods being darker than dyed unmercerized goods when dyed under the same conditions; namely: a slight increase in the amount of color present, a material change in the optical properties, and a considerable difference in penetration of the dyestuff into the fiber.

To further establish these points, dyeings were made with a direct color. As these did not permit ready chemical analysis of dyestuff present on the cloth, a different procedure was followed. Samples of mercerized and unmercerized cloth were dyed in separate beakers at the same time and temperature and all other factors. When dyeing was completed, the unexhausted dyestuff remaining in the dyebath was measured in a spectrophotometer which showed identical exhaustion although there was considerable variation in depths of shade of the dyed cloth.

	r	*R*	*a*	*t*
	%	%	%	%
Undyed unmercerized cloth	63.9	87.7	0.6	35.5
Undyed mercerized cloth	57.0	84.8	0.2	43.2

In another set of direct color experiments we purposely selected a hot dyeing color and a cold dyeing color. Parallel dyeings were made with each color on mercerized and unmercerized cloth with all factors constant. Here the results were very interesting. With the cold dyeing direct color the ratio of depth of shade was 100:127 or practically the same as mercerizing after dyeing with the vat color. With the cold dyeing direct color, however, the ratio was 100:149. Photomicrographs were made of cross sections of the fibers. With the hot dyeing color it was found that on the unmercerized cloth there was no penetration, nor was there any on the mercerized sample, therefore, the increased depth of shade was probably due to optical properties. With the cold dyeing color, however, there was good penetration on the unmercerized sample and practically none on the mercerized sample, so in this case the ratio was greater due to the combination of optical properties and penetration. (Photomicrographs were shown.)

These same factors of light reflectance, absorption and transmittance can probably be found to be the explanation of many troubles of the dyer. Goods have left the dyehouse being what the dyer calls a perfect match, but when they reach the folding room, he is sent for to explain why he is not matching the standards. Dyed cloth was finished with a water repellent mixture to give 6% wax on the goods, also with sulfonated tallow to a content of 6%. Spectrophotometric charts showed these treatments to result in increased depth of shade. When undyed cloth was finished with the same materials, there were similar changes in the amounts of light reflected, absorbed and transmitted. Results on these tests were as follows:

WATER REPELLENT—6% WAX

	r	*R*	*a*	*t*	% *Tetrabromindigo Present*	% *Equivalent Dyeing*
	%	%	%	%	%	%
Undyed cloth	63.9	87.7	0.6	35.5		
Undyed cloth 6% Wax	63.1	81.1	3.7	33.2		
Dyed cloth	4.70	4.70	92.07	3.23	16.3	20.0
Dyed cloth 6% Wax	4.13	4.13	93.28	2.59	16.3	24.5

6% SULFONATED TALLOW

	r	*R*	*a*	*t*	% *Tetrabromindigo Present*	% *Equivalent Dyeing*
	%	%	%	%	%	%
Undyed cloth	63.9	87.8	0.6	35.5		
Undyed cloth 6% Tallow	62.7	81.3	1.0	36.3		
Dyed cloth	4.70	4.70	92.07	3.23	16.3	20.0
Dyed cloth 6% Tallow	4.24	4.24	93.67	2.09	16.3	23.7

In considering experiments to try to explain results obtained with unmercerized and mercerized cotton, it was thought that if the early surmises were correct, they might also explain the differences noted between cotton and rayon when dyed under similar conditions. Accordingly, in the laboratory dyeing there was also included a piece of bright filament rayon of the same weight as both pieces of cotton. In this way, if there was any difference in affinity it could manifest itself. Chemical analysis and photometric charts were made on the rayon. The results were as follows:

DYED GOODS

	r	*R*	*a*	*t*	% *Tetrabromindigo Present*	% *Equivalent Dyeing*
	%	%	%	%	%	%
Cotton	19.7	19.9	73.6	6.7	1.45	1.99
Rayon	11.1	11.2	82.4	6.5	2.00	5.00

There was an increased affinity on rayon so the ratio of dyestuff present was 100:138. The ratio of depth of shade,

however, was 100:250, although it should be mentioned that there was also a shade change which should be considered with the figures of depth of shade, but there is a very material increase in depth, more than is accounted for by increased dyestuff content.

Spectrophotometric charts were also made on undyed cloth with the following results:

UNDYED GOODS

	r	R	a	t
	%	%	%	%
Cotton	63.9	87.7	0.6	35.5
Rayon	53.2	76.4	3.6	43.2

From these figures it is seen that with the undyed rayon there is much less reflectance than with cotton due to increased absorption and transmittance, which will also manifest itself in the dyed goods.

A photo-micrograph of a cross section of the rayon was made which I have here. From this you will see that there is practically no penetration of the dyestuff into the rayon fiber, whereas this one of the cotton shows practically complete penetration.

From these tests comparing bright filament rayon with cotton, it appears that the large increase in depth of shade on rayon is due to three factors: increased affinity for dyestuff, reduced reflectance and decrease in penetration of dyestuff.

One very interesting and convincing fact is shown by various of the foregoing figures; namely, that operations such as mercerizing or finishing, which affect the amounts of light reflected, absorbed and transmitted with dyed goods, cause similar changes with undyed goods.

Perhaps the most outstanding evidence of how great the effect of changing the amount of light reflected, absorbed or transmitted can be is familiar to all of you. You have taken a wet patch from goods on a jig or dye-back or a printed patch from a soaper, looked at it and said, "If we could only dry them up wet, how nice they would look."

Spectrophotometric charts were made on the same piece of dyed goods, in the dry state and wet state. In the wet state there was a very noticeable change in the reflectance at different wave lengths so the formula for % equivalent dyeing cannot be applied, but estimating depth of shade from dominant wave length or point of maximum absorption shows a very pronounced increase. Results obtained from the spectrophotometric charts were:

	r	R	a	t
	%	%	%	%
Dry cloth	4.70	4.70	92.07	3.23
Wet cloth	2.60	2.60	95.56	1.84

These figures show what a marked effect simply wetting dyed cloth has upon the amount of light reflected, absorbed and transmitted. It is particularly striking in the amount of light reflected which is what we see. It shows the big difference between the wet and dry cloth, but you know that when the wet cloth dries out it will look the same as it did before it was wet. Therefore, when you look at a wet piece of dyed cloth it is another case where you see the color but it is not there.

Appreciation is expressed for the assistance and cooperation of Dr. Peter G. Kolupaev of Slatersville Finishing Company in spectrophotometric studies and of the laboratory of Dow Chemical Co., in chemical and spectrophotometric work.

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Nylon Dyeing

(Continued from page P55)

ner were shown on microscopic examination of the fiber cross sections to be only partly penetrated. Probably due to incomplete diazotization, a lake only formed on the outer portion of the fiber, this colored lake showing up as a sharply defined ring. This is followed by a second ring, yellowish in color, of the uncoupled components. This poor penetration of the fiber is reflected in a considerable loss in strength on the subsequent soaping which removes the surface pigment. Slight, and unavoidable, variations in dyeing conditions result in greater or less fiber penetration and coupling with attendant difficulties in duplication of shade in consecutive dyeings.

However, brighter and tinctorially stronger shades can be obtained by applying the naphthanil and bases individually in consecutive baths. After impregnating the nylon with naphthanil from an aqueous alkaline bath at 140°F. the fiber is extracted to remove excess moisture and immersed in a separate bath made acid with HCl containing the desired base for 25-30 minutes at 140°F. Following this the extracted nylon is developed in a sodium nitrite-acid bath and soaped. In spite of the advantages of increased tinctorial strength and brightness offered by this method, they are offset by the fact that the method is cumbersome involving more time as well as increased consumption of steam and water. Cross-sectional examination of these fibers showed that the fibers were considerably better penetrated than those dyed by the one-bath method and this coupling of the base and naphthanil almost completely throughout the firber is the probable explanation for the tinctorially stronger dyeings produced. Less surface pigmentation of the nylon fiber results, very little color being removed by after soaping.

All dyeings of azoic colors on nylon are much yellower or browner in shade than the identical combinations on cotton. Most combinations giving a scarlet shade on cotton dye nylon orange, however, combinations usually producing an orange tend to give redder or browner, not yellower shades on nylon. Due to the difficulties experienced in completely coupling the base and naphthanil on nylon these shades differences which parallel the shade variations on acetate rayon, may be due to the presence of unreacted base or its nitrosamine on the fiber. The majority of azoic colors appear to have excellent fastness to all color destroying agents with the exception of light. Most combinations are fast to crocking, perspiration, washing, soaping, pressing, and in quite a few instances to chlorine. Light fastness is poor, the Fade-Ometer fastness of these colors not exceeding 60 hours exposure in the best instance.

Nevertheless, despite the poor light fastness of the vat and azoic dyestuffs, these colors will be of great interest where exceptionally great wet fastness is desired and low light fastness can be tolerated. For instance, underwear fabrics and the like will probably best be dyed with vat colors. Large quantities of men's half hose have been dyed and doubtless will be dyed in maroons and navy blues with the easily applied and exceptionally fast to washing azoic colors, however, the use of these colors is severely limited by the incomplete shade range offered as well as by the inadequate light fastness.

CONCLUSION

From this discussion, it will be seen that, at the present, the best dyes for nylon from the dyers standpoint are the dispersed acetate colors and provided they are selected with reasonable care appear to offer a simple and effective method of coloring nylon materials. However, no single class of dyestuffs will meet all the demands of dyeing and fastness properties on a single fiber. For the dyeing of nylon hose, the dispersed colors are of great practical interest but since improved wash fastness probably will be required in the future the acetate colors undoubtedly will be replaced by other types possessing superior fastness. For other fabrics, such as woven and knitted nylon mixed fiber fabrics, the disadvantages associated with the fastness properties of the acetate colors will outweigh the advantages associated with their ease of aplication. This deficiency coupled with the limited nature of shades offered, particularly in the bright shade generally as well as homogeneous greens and browns will force the attention of the dye maker and user to be increasingly turned to the production and use of acid and direct colors to meet all

but the highest fastness standards. It is to be anticipated that the use of these water-soluble colors will be fraught with considerable difficulty due to the dyes of this type accentuating fiber to fiber affinity differences and is not to be lightly undertaken. The use of nylon in mixed fiber fabrics will considerably reduce the attendant difficulties of dyeing with these colors and fabrics of this nature should be more easily colored with dyestuffs with superior fastness properties. There remains to be filled only the highest class of fastness such as is provided on silk and cellulosic fibers by the vat and azoic colors. On nylon, unfortunately, these colors present marked problems in application and although fast to wet processing are with few exceptions remarkedly poor in light fastness which, at the present time prohibits their use in the highest type work. In some instances, the chrome colors may meet an exceptionally high standard of fastness, but the range of shades obtainable with these colors is limited and their aplication difficult.

It will be seen, therefore, that the picture of dyeing nylon textiles is only partially complete and awaits new advances in dye and dyeing techniques before coloration of nylon with the ease in which the older synthetic fibers are colored can be accomplished.

NOTICE
to Secretaries
of Local Sections

Please check the listing of the officers of your section on page P43.

If there are any errors or omissions please advise the

American
Dyestuff Reporter
IMMEDIATELY

1945
YEAR BOOKS

The Year Book is now in the bindery and it is hoped that copies will be ready for mailing shortly after the first of February.

MEMBERS
of the
ASSOCIATION
should notify
the
SECRETARY
immediately
of any changes in
ADDRESS

DO NOT
NOTIFY THE
American
Dyestuff Reporter

CALENDAR OF COMING EVENTS

Meeting, New York Section, Downtown Athletic Club, 19 West Street, New York City February 15, 1946.

Meeting, Mid-West Section, Bismark Hotel, Chicago, Ill., February 16, 1946.

Meeting, Rhode Island Section, Providence Engineering Society Hall, 195 Angell St., Providence, R. I., February 22, 1946.

Meeting, Philadelphia Section, March 1, 1946.

Meeting, New York Section, Downtown Athletic Club, New York City, March 15, 1946.

Meeting, Northern New England Section, March 22, 1946.

Sub-Committee Meetings, New York City, April 4, 1946. Chairmen of Sub-Committees who wish to hold meetings should notify the Chairman of the Research Committee.

Meeting, Council, New York City, April 5, 1946.

Meeting, Research Committee, New York City, April 5, 1946.

OTHER ASSOCIATION MEETINGS

Alumni Association, Philadelphia Textile Institute, 45th Annual Banquet, Bellevue-Stratford Hotel, Philadelphia, January 31, 1946.

Association of Cotton Textile Merchants, Victory Meeting and Dinner, Ritz Carlton Hotel, New York, February 1, 1946.

Synthetic Organic Chemical Manufacturers Association, General Luncheon Meeting, Murray Hill Hotel, New York, February 5, 1946.

American Association of Textile Technologists, Builders Club, 2 Park Avenue, New York, February 6, 1946.

Twentieth Exposition of Chemical Industries, Grand Central Palace, New York, February 25-March 2.

American Association of Textile Technologists, Builders Club, 2 Park Avenue, New York, March 6, 1946.

Drug, Chemical & Allied Trades Section, New York Board of Trade, 20th Annual Dinner, Waldorf-Astoria Hotel, New York, March 14, 1946.

American Cotton Manufacturers Association, Annual Meeting, Carolina Hotel, Pinehurst, N. C., May 14, 15, 16, 1946.

UNEMPLOYMENT REGISTER

Members of this association, who are without employment, should forward a statement as to their qualifications and experience. This information will subsequently appear on these pages with an identifying key number. Employers are also requested to file with the American Dyestuff Reporter any vacancies which may occur in their business.

NOTICE TO EMPLOYERS

Personal Histories and Employment Records of the following applicants are on file at the office of the American Dyestuff Reporter. Prospective employers may examine them without obligation.

Key: A—Laboratory and research; B—Dyeing or printing; C—Finishing; D—Sales; E—Instruction; F—Executive.

A-1

Education—B.T.C., Lowell Textile Institute, 1936.

Experience—From 1936 to January 1944 employed as a chemist for a chemical company supplying the textile trade. Experienced on color matching on various types of goods using direct, acid, sulfur and chrome colors; stripping experiments; ether and alcohol extractions; some research work on application of finishes (soluble cellulose and urea formaldehyde resin) to woolen, worsted and union fabrics; apprentice training at two mills in open tub and Franklin dyeing of raw stock, wet and dry finishing, piece and speck dyeing, and carbonizing; some demonstrating and trouble shooting; had charge of factory control laboratory from 1942 undertaking control, analysis, comparative testing, dyé formula and inventory work, technical service, and some research work on textile soaps. Inducted into army in January 1944 and honorably discharged in December, 1945.

Seeks position as textile chemist.

Age 31; married; three dependents; references.

A-2

Education—Graduate, Lowell Textile Institute, B.T.C., 1933.

Experience—Experienced as textile chemist, chemist-spotter, agricultural chemist and U. S. Army inspector on cotton, rayon, woolens and worsteds. Seeks research or control position with future. New England preferred.

Age 34; married; references.

A-3

Education—Ph.D. degree in chemistry, University of Lausanne, Switzerland. Knowledge of French, German and Russian.

Experience—Eleven years as assistant chemist and chemist in charge of laboratory with a large bleaching, dyeing, printing and finishing plant in New England. Experience in dyeing and printing cotton, rayons. Research. Five years with a textile testing laboratory of a mail order house in Midwest. Three years with an industrial research laboratory in vicinity of Boston.

Position desired in a laboratory in the East. References.

A-4

Education—B.T.C., Lowell Textile Institute, 1936.

Experience—One year as assistant to general manager in production of rubber coated textiles. Four years as assistant chemist working on the development and plant control of a number of rubber products including footwear, molded products, industrial rolls, tubing, etc. Seeks position as textile chemist or colorist or allied work.

Age 31, married; references.

A-B-1

Education—Bradford Durfee Textile School.

Experience—Eight years in dye laboratory testing dyes, matching shades, research work, trouble shooting combined with practical work on dyeing and bleaching. Two years as superintendent of dyeing, bleaching and drying. Had charge of laboratory and purchase of all materials for processing. Five years as dyer on cotton, rayon, silk and nylon. Seeks position as dyer, superintendent of dyeing and bleaching, or charge of dye laboratory.

Age 37, married, three children; references.

A-B-C-F-3

Education—High school and full apprenticeship.

Experience—Practical Dyer and finisher. Long experience on specialties for men's wear trouser trade in cottons, cotton and rayon mixtures and cotton and Celanese. Is disposing of interests in progressive finishing plant and seeks position as manager, assistant manager or technical advisor. Thoroughly understands requirements of Quartermaster, especially on herringbone construction.

B-1

Education—2 years high school; 4 years dyeing, 2 years chemistry, Philadelphia Textile School.

Experience—16 years experience as a dyer in one concern. Experienced on auto cloth, wool, cotton, silk, rayon and mixtures of all kinds. Broad experience in field gained by experience in one large, wel-known mill qualifies this man, who is available for immediate employment as a dyer.

Age 37; married; 3 children; references.

B-D-1

Education—Textile dyeing, college chemistry.

Experience—Over twenty-five years experience as dyer on various types of fibers and fabrics, dyestuff salesman, technical advisor on application of mildewproof and waterproof compounds and dyeing of casein fabrics. Seeks position as technical advisor and trouble shooter in viscose or protein fibers or as salesman of dyes or auxiliary compounds.

Age 47, married, four children; references.

B-D-3

Education—B.T.C., Lowell Textile Institute, 1939.

Experience—One year's experience as assistant dyer on wool felt hat bodies and raw stock, chemical control and research. Five years' experience as inspector of textiles for Q.M. depot, quality control and expediting in the finishing of cotton textiles. Seeks position as assistant superintendent, foreman, or in technical sales or research.

Age 28, married, three children; references.

APPLICANTS WHO OBTAIN EMPLOYMENT
SHOULD NOTIFY THE REPORTER IMMEDIATELY

From The Reporter Files

TEN YEARS AGO

Henry L. Miller, formerly vice-president and technical director of the Quaker Chemical Products Corp., formed the Haas-Miller Corp. for the manufacture of textile oil products, specializing in chemical finishing.

Andrew J. Kelly was elected to the presidency of the Chattanooga Engineers' Club.

The Perkin Medal for 1936 was presented to Professor Warren K. Lewis of the Massachusetts Institute of Technology.

TWENTY YEARS AGO

August Klipstein, founder of the firm of A. Klipstein & Co., died at his residence, 378 West End Avenue, New York, on January 8th, in his seventy-eighth year.

TWENTY-FIVE YEARS AGO

The North Hudson Color and Chemical Co. was chartered in New Jersey for the manufacture of colors, chemicals, etc.

The Sanborn Chemical Co. of Bound Brook, N.J. leased a building in Putnam, Conn., for use as a dye manufacturing establishment.

At the annual meeting of the American Dyes Institute, R. C. Jeffcott of the Calco Chemical Co. was re-elected president.

The Newport Chemical Works, Inc., discontinued its New York office with the announcement that the business would be handled at the general offices in Passaic.

Paul Nobbe resigned his position as vice-president of American Aniline Products, Inc., and accepted the position of vice-president and sales manager of the dyestuff department of Commonwealth Color & Chemical Co.

• NEW AMERICAN ANILINE DYESTUFFS

American Aniline Products, Inc., 50 Union Square, New York, N. Y., has announced three new products as follows:

Alizarine Fast Grey L2B-L2BN—said to possess an extremely high rating in light fastness together with very good fastness to washing, fulling, perspiration and water spotting. The color dyes wool from an acid or neutral bath or by the chrome methods and is suitable for use as a base or shading color for all mode shades. It is especially recommended by the manufacturers for household and automobile upholstery materials because of its light and water fastness.

Chromaven Brown GR—a new chrome brown said to be rich in tone and productive. It may be applied to wool in all stages of manufacture by any of the chrome dyeing methods. It is stated that the product is of good solubility, levels well and has outstanding fastness to light, washing, perspiration, milling and sea water.

Amanthrene Grey G L Paste—a distinctive type of vat grey said to be suitable for use in practically any state of cotton or rayon manufacture, as well as combinations of same with wool. It is serviceable as a self shade or in combinations for pale to medium deep tones. It is stated that it levels easily and is particularly recommended by the manufacturers where excellent fastness to light, washing, chloring and water spotting are required.

• COMMONWEALTH ESTABLISHES NEW LABORATORY DIVISION

Furthering plans for their post-war expansion program, Commonwealth Color & Chemical Company of Brooklyn, New York, announces the opening of their new Hosiery and Underwear Division, and has engaged Martin W. Mueller, B.Sc., who will be in charge of the Division's newly equipped laboratory at the Brooklyn, N. Y. plant and will act as Director of Research and technical service work for the new unit.

Martin W. Mueller

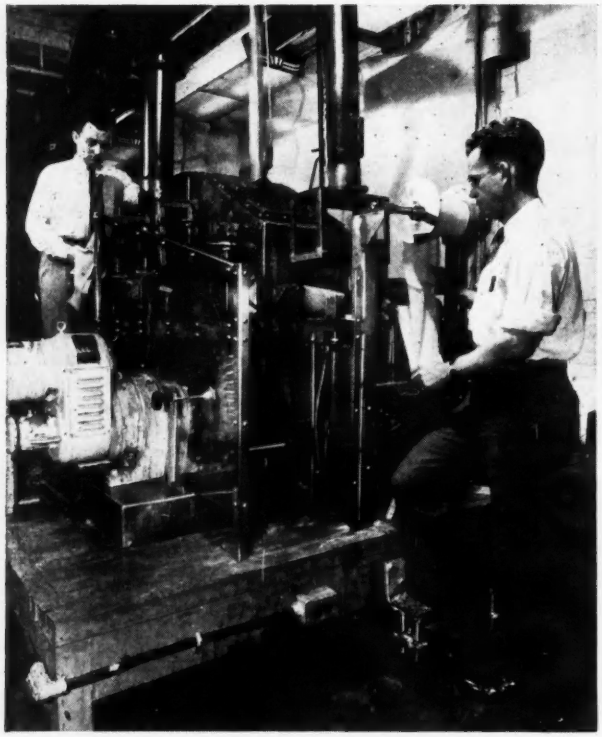
Mr. Mueller attended the University of Southern California, and is a graduate of the University of Wisconsin. Following his academic training, he became associated with Phoenix Hosiery Company of Milwaukee, Wis., to begin a thorough training in the processing of knit goods. After one year of apprentice full fashioned knitting, Mr. Mueller was transferred to the dyehouse laboratory, and was later placed in charge of research, which position he held until he became engaged in color matching on all types of ladies, children's, and men's hosiery and cotton yarns. In 1940 his firm sent him to the Institute of Paper Chemistry at Appleton, Wis., for special training in physical chemistry. Upon his return he was placed in charge of a research project designed to improve full fashioned hosiery from a standpoint of appearance, wear, and uniformity of manufacture. This program covered the entire mill, with equal emphasis upon throwing, knitting, dyeing, and finishing.

Mr. Mueller left the Milwaukee organization in 1941, to become associated with the General Athletic Products Company of Greenville, Ohio, as Superintendent of Dyeing, Bleaching, and Finishing, and gained wide experience in kier-boiling, scouring, and dyeing of cotton, rayon, and woolen knit goods, as well as pre-shrinking and general processing of Army and Navy underwear cloth. He also did considerable consulting work for other mills during this period. Mr. Mueller retained this latter position until joining Commonwealth on January 1st.

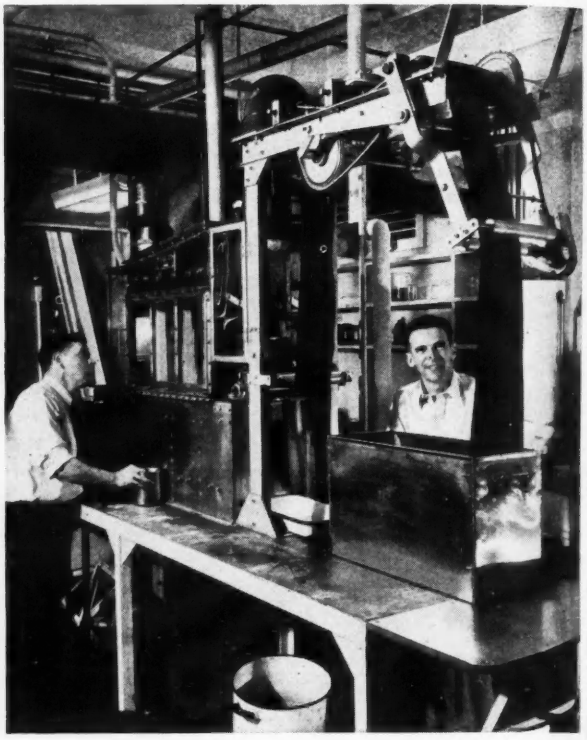
Commonwealth's new Hosiery and Underwear Division is the result of a long-range program of careful planning, and the control laboratory, recently completed, is equipped with the latest post-war processing and testing equipment, ranging from fine research equipment through dyeing and finishing machinery, and will afford the firm the opportunity of offering a complete technical service to the knit goods trade. The new Division will be under the management of Charles M. Robbins.

• du PONT TECHNICAL LABORATORY

The du Pont Technical Laboratory, Chambers Works, Deepwater, N. J., was established to render a color service to all color consuming industries. Miniature and full-sized mill apparatus is used for this purpose and new methods are also devised by which available equipment can be converted into actual plant operations as closely as possible. Chief functions of the laboratory are standardizing of dyes, technical service to customers, and research. Standardization comprises systematic and thorough tests to determine the quality of the manufactured products as compared with a definitely established standard. Technical service includes the selection and proper application of dyes for specific pur-



Working Model of the Multi-Lap Machine, Developed by the du Pont Company Dyestuffs Division.



Working Model of the apparatus for the Pad-Steam Process a du Pont's Technical Laboratory.

poses, matching of shades, evolving new and economical application procedures and, where possible, reduction of costs. Printing methods are also included.

Other functions of the laboratory include the testing of finishes and the evaluation of numerous assistants. In addition to textiles, dyes and pigments are also tested for use on leather, paper and other industrial products.

With increased emphasis on vat dyes indicated for the post-war period, two of the newest developments in this field in operation for some time past at the laboratory are the Pad-Steam and Multi-Lap processes. Millions of yards of fabrics have been commercially dyed by the Pad-Steam process and the first commercial machine of the Multi-Lap process is about to go into operation. A wide variety of natural and synthethic fibers may be vat dyed by these processes.

The Pad-Steam process which is familiar to our readers provides a simplified and more flexible continuous process, which can be used for short as well as long yardages. It departs from the customary vat dyeing methods with respect to time and temperature. Ordinary methods involve reduction of the dyestuff to the leuco form by means of sodium hydrosulfite and caustic at temperatures of from 120 to 140 degrees F.; and an hour or more is usually required for the reduction and dyeing. It had been known for years that by raising the temperature the process could be speeded up, but the leuco derivatives are not chemically stable at higher temperatures and undergo serious changes when held at these heats for appreciable periods of time. However, it was found that if the reduction of the vat color on the fabric is carried out at 212 degrees F. in a matter of seconds, the chemical stability of the leuco compound is entirely satisfactory.

The Multi-Lap machine was designed for the continuous dyeing of delicate fabrics, such as ladies' woolen dress goods, spun rayons and combinations of animal and vegetable fibers. In ordinary continuous dyeing processes in which there is considerable tension, these could not be handled without undue distortion or crushing, or without risk of deteriorating the fibers. The new machine carries the cloth around on an endless steel conveyor, with very little tension on the cloth, dipping it into the bath on each lap, and finally turning it at a right angle to bring the fabric out from the center of the reel.

• LOWELL TEXTILE LUNCHEON

An impromptu luncheon of graduates of the Lowell Textile Institute held during the Victory Convention of the American Association of Textile Chemists and Colorists resulted in an attendance of 42. It was held on Saturday, January 5th. Present was Kenneth Fox, the new president of the Institute.

Discussion developed that it was desirable to make such a luncheon a regular feature of future A.A.T.C.C. conventions and plans were started in conjunction with the Silver Anniversary Convention to be held in Boston in December of this year.

Indications were that members in the New York territory would revive the New York Alumni Chapter.

• MANAGER, CALCO PLANT

S. C. Moody, general manager of the Calco Chemical Division, American Cyanamid Company, Bound Brook, New Jersey, announced recently the appointment of Don H. W. Felch as manager of the new Willow Island, West Virginia plant.

It was also revealed that plans for the first production and service units are well advanced and that construction at the site has begun. The contracts for the major construction work, including sidings, foundations, roadways and structures, have been awarded to the Turner Construction Company of New York. Present plans for the Willow Island plant call for the initial manufacturing buildings, warehouse, and steam plant, the cost of which is expected to be approximately $3,000,000.

The new plant will enable the Calco organization to broaden its activities

through the introduction of new products developed by the Stamford Laboratories of the American Cyanamid Company as well as those developed by Calco's own research groups. It is also intended to relocate at the new Willow Island plant the present inorganic pigment department, now located at Newark, N. J. It is expected that the construction of the first units will have been completed by the end of 1946.

• HOOKER APPOINTMENT

The Hooker Electrochemical Company of Niagara Falls, N. Y., has recently assigned Charles Y. Cain to the sales territory in the vicinity of Chicago, Illinois. A graduate of the University of Maine, he has spent a number of years in the Niagara plant and in the Niagara sales office prior to his assignment as a salesman.

• SYNTHETIC RESIN PROCESS MACHINERY

Textile machinery of wholly new design, fabricated specifically for the treatment of textile yarns or rovings made of various natural or synthetic fibers by the synthetic resin process originated and developed by Riverside & Dan River Cotton Mills, is to be manufactured by Walter Kidde & Company of Belleville, N. J., according to an announcement by officials of Dan River Mills.

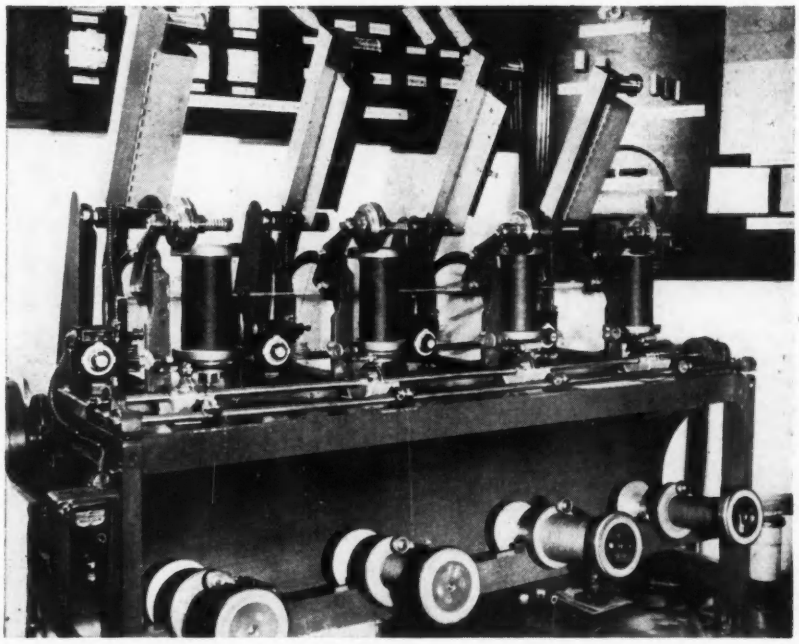
The new machinery will follow closely the design worked out by Dan River Mills in their own machine shops in Danville. It comprises a unit for the treatment of the textile yarn or roving with synthetic resins or such bonding agents as may be desired, and a second unit for the tensioning and curing of the treated yarn or roving.

For certain products these two operations may be combined in one unit, so that the resin treatment and the tensioning and curing are one continuous operation.

Certain refinements evolved by the Kidde engineers are being incorporated in the new machines.

Dan River Mills have a number of machines of their own manufacture in commercial production of treated yarns and rovings, and it has been possible to distribute a few sample machines to other textile manufacturers who are collaborating in the development and improvement of Fiber-Bonded products, but the full demand for machines could not possibly be met except by a company specializing in the commercial production of textile machinery.

By the terms of the agreement, Walter Kidde & Company will manufacture and distribute the machines to licensees of the Dan River processes. The Kidde Company also will have available the various chemicals, resins and other supplies necessary to the operation of the process.



The Tensioning and Curing Machine, major unit of the fiber bonding process of Dan River Mills. The machine is being manufactured by Walter Kidde & Co., of Belleville, N. J. This machine was exhibited at the Victory Convention of the A.A.T.C.C.

• SUN CHEMICAL ACQUIRES WARWICK

As a part of a postwar expansion program, Sun Chemical Corporation, formerly known as General Printing Inks Corporation have announced the acquisition of Warwick Chemical and all its subsidiaries.

Ernest Nathan

Dr. William Talbot

Ernest Nathan continues as president of Warwick whose policies and personnel remain unchanged. Dr. William Talbot, Technical Director and Secretary of Sun Chemical Corporation becomes president of its fine chemical division which includes, in addition to Warwick, the pigment division of the parent company.

Mr. Schoepf, president of Sun Chemical Corporation, in announcing the acquisition, said that sales of the combined companies including Warwick for 1944 were in excess of $20,000,000. It is also pointed out that the merger will enable Warwick Chemical to draw heavily on the large and important research facilities of the new organization in the development of their fine chemicals for textile, paint, plastic, rubber and other fields as well as market new products already developed by the Sun Chemical Company.

Among the important products of Warwick Chemical, produced in their factories at West Warwick, R. I., Wood River Junction, R. I., and Rock Hill, South Carolina, are "Durable Norane" and "Weather-Sealed" Impregnole water-repellents widely used in the men's, women's and children's rainwear, sportswear and outerwear fields, which are marketed through the Impregnole Corporation, a fully owned subsidiary.

Other subsidiaries affected by the consolidation, are Warwick Wax Co., 221 West 57th Street, New York and Warwick Wax

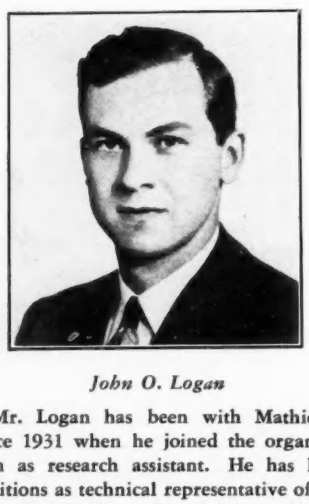
Refining Co., manufacturers of Microcrystalline petroleum wax and petroleum chemicals located at Chanute, Kansas.

● BULLETIN ON ALROSOL

The Alrose Chemical Co., Providence 1, R.I., has announced the release of a 12 page technical bulletin on Alrosol, a wetting agent and detergent. The main textile use of Alrosol is as a scouring agent but other uses include its application as a bleaching accelerator with alkaline peroxide, an aid in stripping vat dyeings, a dyeing assistant especially with basic colors and vat dyes, an assistant in sizing and desizing, an aid in finishing. Copies of the bulletin, as well as a sample of the product, are available upon request.

● MATHIESON APPOINTMENTS

John O. Logan has been appointed an Assistant General Manager of Sales of The Mathieson Alkali Works, it is announced by G. W. Dolan, President of the company. Mr. Dolan also announces that Harry P. Smith has been appointed New York District Sales Manager, a post formerly held by J. B. Peake, who continues as an Assistant General Manager of Sales.



John O. Logan

Mr. Logan has been with Mathieson since 1931 when he joined the organization as research assistant. He has held positions as technical representative of the New York office, then of the Chicago office and, again in New York, as assistant to the Manager of the Technical Service Department. Most recently, he served as Western Sales Manager of the Chicago office.

Among Mr. Logan's achievements in the chemical world are patents on the generation of chlorine dioxide and the manufacture and use of sodium chlorite. He is the author of several technical treatises and papers on ammonia, water treatment, bleaching, and dry cleaning.

Harry P. Smith, a native New Yorker, was Treasurer, Vice President, and

Harry P. Smith

President of the George Chemical Company, before joining The Mathieson Alkali Works. He is a member of the Dutch Treat Club and the Chemical Salesmen's Association of New York.

Both Mr. Logan and Mr. Smith will make their headquarters in the New York offices of the company.

● "DEFINIZED" FINISH

"Definized," a new stabilizing finish that is said to make rayon fabrics fully washable, promises to revolutionize the entire textile field in fashions and home furnishings, according to an announcement by William H. Scott, president of the Aqua-Sec Corporation, 1450 Broadway, New York City. This process was developed by the Alrose Chemical Company, Providence, R. I., who have applied for patents.

Explaining that the name applies to a new method of controlling the shrinkage and stretching of rayon fabrics, Mr. Scott pointed out that "it is possible now to have a really washable rayon garment without having to run the risk of additional shrinking."

This new stabilizing process has had thorough laboratory and mill production test. Virtually hundreds of thousands of yards of rayon materials have been successfully "Definized" with results that have far exceeded the expectations of the developers. The tests were conducted to determine length of wearability and, after repeated launderings, it is stated that "Definized" rayon showed good abrasive resistance with no loss of tensile strength or chlorine damage and with minimum shrinkage or stretching distortions.

It is claimed that thus far the "Definized" procedure has succeeded in reducing dimensional change in rayon fabrics to 1% or less, and all indications are that this is percentage of residual shrinkage which will apply to fabrics processed with this new chemical finish.

Because rayon fabrics may be "Definized" simply by applying special chemicals in the finishing process, this does not represent a complicated manufacturing problem. It is claimed that the method has proven simpler and less costly than any other introduced thus far. No new machinery is required. The finish will be available in large quantities to textile manufacturers in the next month or two. Finished "Definized" articles put on the market will be appropriately labeled for consumer identification.

The "Definized" finish is a matter of gray room operation. It is a simple chemical application padded to the gray goods, and then dried, after which these goods are immersed in another chemical liquid. They are then followed by the usual boil-off and dyeing procedure. Another significant factor is that "Definized" control is said to give cleaner color definition in dyeing and printing and, in the case of white goods, heightens its brilliancy.

The Aqua-Sec Corporation will merchandise "Definized" through their offices at 1450 Broadway.

● D. C. A. T. DINNER

Harold M. Altshul (Pres., Ketchum & Co., Inc.) newly elected Chairman of the Drug, Chemical and Allied Trades Section of the New York Board of Trade announced that plans are now being made to hold the Section's 20th Annual Dinner on March 14, 1946 at the Waldorf-Astoria, New York City. This annual dinner, cancelled last year in keeping with wartime conservation, is the largest event of its kind in the industry, attracting over 2,200 leaders in the drug, chemical and allied trades when last held in March, 1944.

● NEW SYLVANIA PROCESS

Substituting an oxidizing agent for heat, Sylvania Industrial Corporation has developed an improved method of making cellulose suitable for textile finishing. In the past, heat has never been completely satisfactory because of the difficulty of controlling the exact amount of it that is required, and as a result, local over-heating created non-uniformities in the finished product.

Patent on the new process has been issued to the company in the name of Dr. Ralph T. K. Cornwell, Director of Research. According to it, the cellulose is treated with an oxidizing agent for sufficient time to increase its solubility in aqueous alkaline solutions. The patent also covers the fact that in the research on this new method Dr. Cornwell discovered that waste regenerated cellulose material is a preferred material to use in making this finishing agent.

Because of the inexpensive raw materials required and the ease of controlling the manufacturing process, the new product is expected to have a large potential use

in postwar developments in the textile finishing field. In addition, present indications are that it will also be widely used as a pigment binder in the printing and pad dyeing of textiles.

• SECRETARY, ANSUL CHEMICAL

Robert C. Hood, who received his discharge in November from the U. S. Coast Guard in which he had the rating of lieutenant and who saw service in the Pacific on a combat cargo ship, was elected secretary of Ansul Chemical Company, Marinette, Wisconsin, at the firm's annual meeting of the board of directors December 10.

Mr. Hood, younger brother of F. J. Hood, Ansul's vice-president and president of the Refrigeration Equipment Manufacturers Association, was associated with the firm before he entered the service in 1943. He joined the company following his discharge.

Other officers re-elected were H. V. Higley, president; F. J. Hood, vice president; J. F. Asell, treasurer; and Mrs. F. G. Hood, mother of Robert C. and F. J. Hood, chairman of the board.

• NATIONAL CHEMICAL EXPOSITION

The date of the National Chemical Exposition has been moved up to September 10th to the 14th inclusive in 1946 and will be held at the Chicago Coliseum at 15th and Wabash Avenue, says Dr. H. E. Robinson, Assistant Chief Chemist of Swift & Company, and chairman of the Exposition Committee of the Chicago Section of the American Chemical Society—sponsor of this well established international event. Marcus W. Hinson, who has managed these expositions since their inception in 1940, will again be Exposition Manager.

• APPOINTED DIRECTOR, REGIONAL LABORATORY

Col. Walter M. Scott became Director of the U. S. Department of Agriculture's Southern Regional Research Laboratory in New Orleans on his release from active duty in the armed forces on December 30, 1945, Dr. O. E. May, Chief of the Bureau of Agriculture and Industrial Chemistry has announced. Col. Scott succeeds the late D. F. J. Lynch who directed the Laboratory from its establishment in 1938 until his death a few months ago.

Col. Scott received his Bachelor's degree in chemistry from Yale University in 1912 and his Ph. D. from the same institution in 1915. He possesses an intimate knowledge of cotton textile problems and their importance to southern agriculture. As head of the Cotton Chemical Finishing Division of the Southern Laboratory, until called into active military service, he gained valuable information on cotton utilization. He obtained further experience in the Chemical Warfare Service in World War II. This combination gives him the type of background needed to direct the New Orleans Laboratory which is one of the most important agricultural research centers in the South.

Col. Scott had 11 years experience as chief chemist for a large silk manufacturing company, nine years as service director for a chemical research organization, and a number of years as technical advisor to a dyestuff sales department before he joined the staff of the Southern Laboratory in 1939. He has specialized in problems connected with the dyeing, printing, and finishing of cotton, silk, wool, and rayon fibers and fabrics, and in color measurement and specification. He has had considerable experience with cellulose esters and ethers and the various types of synthetic resins. He is the author of more than 40 technical papers, and has been granted several patents. Col. Scott has been a long-time member of the American Association of Textile Chemists and Colorists and has been a member of its council and research committee. He is also Chairman of the Textile, Dyeing, and Finishing Committee of the American Society for Testing Materials, a member of the American Chemical Society, and a Fellow of the American Institute of Chemists.

He served in both World Wars, and received a number of citations including the Legion of Merit for outstanding service in World War II. He was sent to London in July 1942 as Assistant Chief of the Technical Division of the Chemical Warfare Service in the European theatre, and was made a full Colonel and Chief of the Division in November of the same year. After the invasion of Europe he set up offices in Paris. As Chief of the Division he had among his responsibilities such protective measures as clothing, gas masks, and decontamination equipment.

• APPOINTED VISITING PROFESSOR

Dr. Milton Harris has been appointed Visiting Professor of Textile Chemistry at the Polytechnic Institute of Brooklyn, it was announced recently by Dr. Harry S. Rogers, president of the Institute.

In his teaching at the Polytechnic, Dr. Harris, who has just received the Olney Medal of the American Association of Textile Chemists and Colorists for outstanding achievement in the field of textile chemistry, will be associated with the Highpolymer Research Institute, of which Dr. Herman F. Mark is director.

Dr. Harris began his association with the Polytechnic in November when he presented the first session of a series of symposia on current phases of textile research. The second session of this series will be held Saturday, February 23rd, on the "Fundamentals of Finishing Processes," under the chairmanship of Dr. Harris.

According to Dr. Rogers, the appointment of Dr. Harris, who is considered to be an outstanding world authority on fiber structure, rounds out the comprehensive offerings of the Highpolymer Research Institute, which is the only complete division of its kind in an educational institution in the country.

The speakers for the symposium on the Fundamentals of Finishing Processes are: Sidney Coppick, of the American Viscose Corporation, who will discuss "Some Fundamentals of Flame-Proofing Textiles"; Arnold Sookne, of the Milton Harris Associates, "Water-Repellent Fabrics"; Lee Shanor, of the Army-Navy NDRC Tropical Deterioration Project, "Fungus-Proofing of Cotton Textiles"; and Dr. Harris, "Theory of Shrink-Resisting Treatments for Wool."

Representatives of the textile industry and of research institutes and others connected with the field of textiles have been invited to attend the symposia which are open to the public without charge. The third and final session is to be announced.

• PIGMENT DYEING AT DAN RIVER

Experimental runs in pigment dyeing recently completed at Dan River Mills show unusual results in the dyeing of fabrics made from low grade cotton and containing many neps. It is stated that, contrary to results obtained by other dyeing methods the pigment dyeing process as developed at Dan River Mills gives complete uniformity of shade on these cheaper cotton fabrics and avoids the uneven dyeing of neps which heretofore has been characteristic of all dyeing methods on this type of cloth.

It is claimed that there was found to be no shading whatever because of the presence of neps which were dyed the identical shades of the fabric and therefore are not observable.

The Dan River pigment dyeing process was developed for and is primarily applicable to fabrics made of high grade cotton and synthetics. It now develops that it is equally as effective in the dyeing of fabrics made of low grade cotton.

• duPONT RAYON RESEARCH CLASSIFICATIONS

A new series of research positions designed to make science as a career as attractive as the administrative field in industry was announced recently by the

Technical Division of the Rayon Department of E. I. duPont de Nemours & Company. The classifications will offer new opportunities in salary, responsibility and prerogatives.

The plan, which departs from industry's general policy of recognizing outstanding scientists by promotion to administrative posts in research, provides for three classifications of "research associates."

It places greater stress on fundamental work by establishing research positions with salary rates corresponding to those for supervisors, managers, and assistant research directors, it was explained by Dr. E. B. Benger, manager of the Technical Division.

The new classifications, which are open to chemists, engineers, and other technically-trained employees demonstrating unusual scientific ability, are specified by the titles of "junior research associate," "research associate,' 'and "senior research associate."

● **SYNTRAG**

Stein, Hall & Co., Inc. has announced a new product, Syntrag, as a thickener for screen printing of Indigosol, Rapidogen, direct, acid, basic and acetate dyestuffs. Syntrag can also be used for white pigment discharge printing in conjunction with albumen and synthetic resin binders.

For many types of printing, particularly where unusually soft hand is required, it has been customary to use a solution of Gum Tragacanth as a thickener. Offered as a replacement for this Gum Tragacanth solution, Syntrag is said to give equal if not superior results, and at a saving.

Syntrag can be used wherever a gum thickener is used, but is not recommended for chrome or vat colors. It is especially recommended by the manufacturers for printing rayons, spun rayons, acetates and other fine fabrics.

Advantages claimed include color yield and brightness equal to that of starch and superior to natural gums, excellent rinsibility, and penetration which eliminates the possibility of the mottled effect which usually results from uneven penetration.

● **NAYBASOLS**

Naybasols are a new and particularly practical addition to the Naylee industrial chemicals. Developed by the research specialists of the Naylee Chemical Company of Philadelphia, Naybasol pastes are said to have proven their adaptability and versatility in many industrial applications.

The Naybasols are said to be powerful wetting agents in that the strongly hydrophilic character of the solubilizing groups has been altered and intensified. It is claimed that this radical change gives the Naybasol pastes superb wetting, sudsing and detergent action.

At the present time the Naybasols are being used extensively in the processing of textile fibers and fabrics, synthetic latices and plastics; leather and paper pulp and water paints. Miscellaneous utilities are to be found in ceramics, dairies, cleansing and shampooing liquids, dyeing, nonmetallic flotation agents and orchard sprays.

● **AEROTEX SOFTENER H**

An addition to textile finishing chemicals has been announced by the Textile Resin Department of the American Cyanamid Company. It is called Aerotex Softener H. This softener is said to make it possible to control almost completely the smoothness and suppleness of hand of all types of fabrics regardless of what other chemical treatment they may receive.

As efficient on rayons as it is on cottons and wools, the new softener is well adapted for use with all types of blends, including mixtures of wool and rayon. In contrast to earlier chemical finishes of this type, it is said to offer exceptional resistance to washing and dry cleaning and does not discolor or develop odor.

According to American Cyanamid, Aerotex Softener H is superior to most synthetic softeners since it has less tendency to affect lightfastness properties of direct and developed colors. Nor does it have any tendency to discolor white goods.

It is claimed that the use of Aerotex Softener H makes possible the elimination of other wetting agents since it has proved to be an excellent wetting agent itself. The finish also has value when used in a resin impregnation bath to reduce the bleeding of certain dyestuffs during impregnation.

Extensive dermatitis tests are said to show the product to be absolutely free of any tendency to irritate or sensitize the skin.

The new softener is a synthetic particularly adapted for use with the new resin finishing processes. It is stated that it does not affect finishes designed for shrinkage, stretching and creaseproofing control.

Composed of colloidal components blended on the alkaline side, it is designed especially for dispersion in warm water by ordinary stirring.

● **GUIDE FOR QUADRAFOS**

"Textile Processing with Quadrafos" is the title of a condensed guide to the use of Quadrafos in all types of textile wet processing. This new folder issued by Rumford Chemical Works explains how to use Quadrafos, the company's brand of sodium tetraphosphate, in many applications in the textile industry. Copies may be obtained from leading distributors of textile supplies or direct from Rumford Chemical Works by requesting Bulletin No. 140.

Brief technical information regarding the properties and characteristics of Quadrafos is given in the folder but its principal value for textile operators is the section devoted to directions for use of the product. This section is devoted to the various operations for processing woolens, cottons, rayons, linens and silks with specific, understandable information as to the steps in various operations where Quadrafos can be introduced to improve efficiency and achieve better results. A practical table of equivalents is shown for figuring the percentage of Quadrafos to use as related to the weight of the material to be processed.

● **NEW SYNTHETIC FIBER COURSE**

Columbia University, Extension Division, announces that a new evening course in new synthetic textile fibers, yarns and materials will be given by Herbert R. Mauersberger.

This course will include all new man-made fibers, yarns and fabrics, other than rayon, namely: nylon, Vinyon, Aralac, Velon, Saran, glass, soybean fiber, peanut fiber and plastic-coated yarns. Their classification, physical, chemical and microscopical properties and characteristics will be explained fully on the basis of samples, films and exhibits.

This 15 lecture course is the only one given in New York City and begins February 4, 1946 at 7 P.M. in Room 214, Hamilton Hall, 116th Street and Amsterdam Avenue, New York City. Registration begins on January 30, 1946.

● **SALES MANAGER, P&G**

The appointment of Mark Upson as General Sales Manager of the Procter & Gamble Company, Cincinnati, has been announced by Thos. J. Wood, vice president in charge of sales.

Mr. Upson joined the company in 1915 and at the time of his promotion was manager of the Eastern Sales Division.

E. C. Moffatt, manager of the company's Western Sales Division will succeed Mr. Upson, and Paul R. Parrette, at present in charge of the Los Angeles District Office, will be brought to Cincinnati to succeed Mr. Moffatt.

● **BACON LABORATORIES**

Announcement is made by Frederick S. Bacon of the formation of a partnership with Philip D. Wilkinson under the name of Frederick S. Bacon Laboratories which will continue the chemical research and consultation business established in 1939 at 192 Pleasant Street, Watertown, Mass.

• calcochrome alizarine gray 2BLS
• excellent fastness
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Here is a new and improved wool dye . . . unsurpassed as a base for seasonable grays . . . also an excellent shading color for buffs, tans and taupes. Especially desirable for automotive and upholstery fabrics because of its high degree of fastness to light and water spotting, Calcochrome Alizarine Gray 2BLS is equally suitable in union, acid or chrome formulations for apparel fabrics.

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Calco's new Color Announcement Bulletin containing complete information on this new dye will be sent to you on request.

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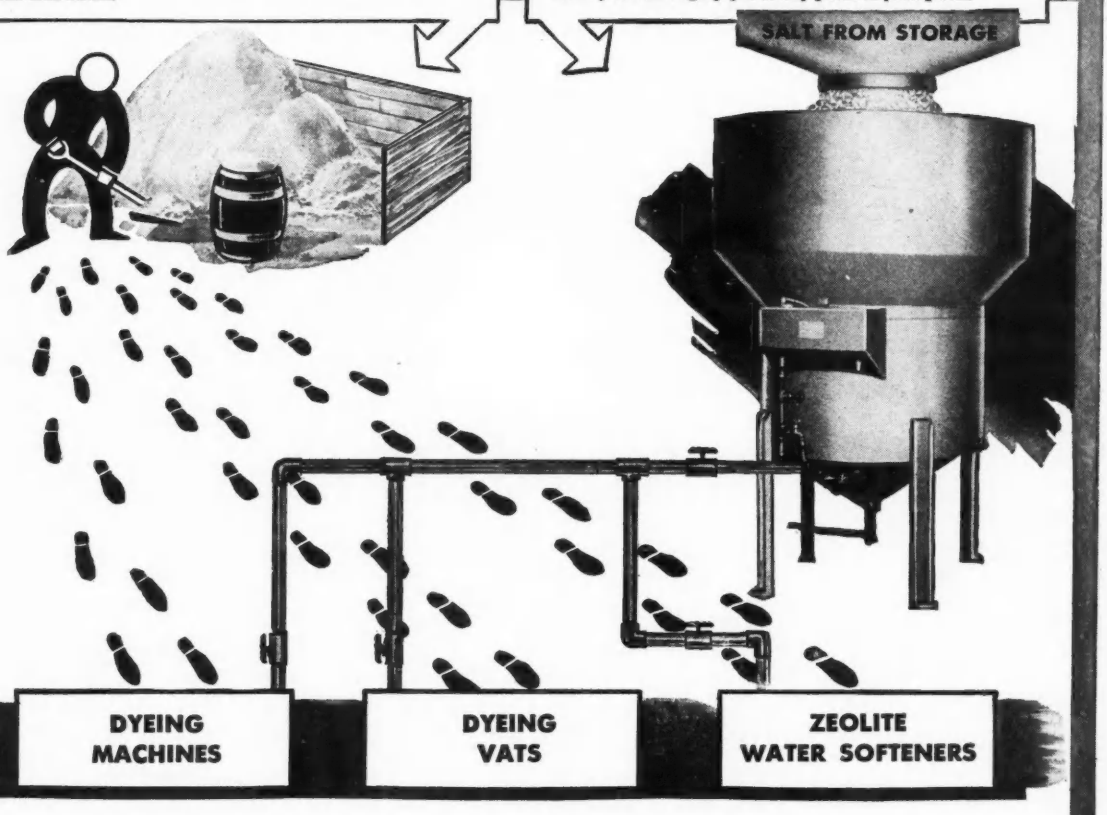

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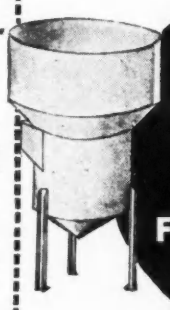

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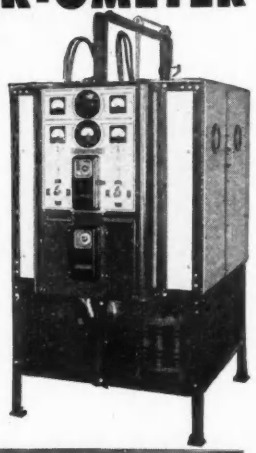
now has taken an equally important place in the industry for testing fabrics exposed to weathering under war conditions. The Weather-Ometer will accommodate large size specimens to meet the Federal specifications demanding accelerated tests.



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The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i.e., help wanted, machinery or supplies for sale—the rate is $6.25 per column inch or less per insertion.

WANTED: SALESMAN-TECHNICIAN. To call on textile mills to sell and demonstrate chemical products. Must be familiar with manufacture and finishing of cotton and mixed goods. Prefer chemical or chemical engineering training or graduate of textile school. Salary would depend on qualifications and experience. State full particulars as to age, family status, education and experience. Box 795.

POSITION WANTED: Hosiery Chemist and Colorist with several years experience on formulation research and production. Box 774.

WANTED TECHNICAL SALES ASSISTANT: — Rare opportunity to become permanently connected with nationally recognized manufacturer of textile processing specialties. Prefer graduate of textile institute with mill experience. Will act as assistant to District Manager covering Pennsylvania, Maryland, Delaware, Virginia. Salary plus bonus. Write giving complete educational and business background. Replies held in strict confidence. Our organization knows of this advertisement. Box 798.

POSITION WANTED:—Dyer 34 years old, 15 years experience, cotton, rayon, acetate crepe piece goods, and knit products, some finishing experience. Box 799.

CONFIDENTIAL EMPLOYMENT SERVICE — We invite correspondence (confidential) with Dyers, Chemists, Colorists, Superintendents, Master Mechanics, Office Managers, and others seeking positions and with employers seeking high-grade men to fill vacancies or to make replacements. Charles P. Raymond Service, Inc., 294 Washington St., Boston, Mass. Over forty-five years in business.

POSITION WANTED: Textile chemist and Dyer, 18 years experience in Woolen, Worsted and Silk Mills. As Chief Chemist. A1 references. American, at present Chemist in a large mill. Wish to make a change, 8 years chief chemist with a large worsted and woolen mill. Box 783.

POSITION WANTED: Textile chemist 20 years experience, Cotton, Rayon, Acetate Silks. Now working on Nylons. Thoroughly up on all dyestuffs and chemicals, for quick dyeing results and color fastness. Open for a position February 1st. Box 807.

POSITION WANTED: as chief chemist in a mill manufacturing Cotton, Rayon and Acetate goods. 15 years laboratory experience in this line. Experienced on all types of dyestuffs, chemicals, finishing compounds, wetting out agents and fireproofing products. Some dyeing experience, 9 years chief chemist with a large mill. Employed at present desire to make a change. Box 784.

POSITION WANTED: Chemist, research development, and production experience processing pigments for textile printing. Possess working knowledge of the properties of textile fibers and the application of finishes, chemicals and coatings. Harvard and M.I.T. education. Member of the A.A.T.C.C. and the A.C.S. Will consider either laboratory, production, or technical sales service position. Metropolitan New York area preferred. Employed at present. Box 806.

POSITION WANTED: Textile Chemist, 15 years laboratory experience in wool and worsted mills, also dyeing experience. Best of references. Box 808.

POSITION WANTED: Experienced Technician, Colorist, Chemist dyeing experience. Thoroughly up on all classes of dyestuffs, chemicals, finishing products for Cotton, Rayon, Acetate silks and Nylons, 20 years mill laboratory experience. Best of references. Box 809.

WANTED: Textile piece-goods dyeing plant supervisor. A man thoroughly familiar with the dyeing of mixtures of viscose, acetate, wool and aralac to take over the supervision of grey-room, boil-off and dyehouse of large piece-goods dyeing plant located in the Metropolitan New York area. Applicants should furnish photo with qualifications and salary desired. Box 810.

Nationally known dyestuff manufacturer has an opening for a salesman in upper and western New York State. Prefer young man currently residing in this area with suitable textile and dyestuff application background. State age, education, experience and personal data. Box 797.

POSITION WANTED: Sales-Service man with excellent background desires to connect with reliable dyestuff and chemical concern to cover the New Jersey territory on a salary plus commission basis. Box 811.

POSITION WANTED: Screen Print Colorist, 15 years experience as assistant colorist, colorist and superintendent. Familiar with every phase of screen printing. Employed at present, desire to make change. Box 813.

WANTED: A capable man able to take complete charge of screen printing plant in California. Very interesting arrangement for right man. Box 812.

(*Additional Classifieds on Page XXXIII*)

• CLASSIFIED ADVERTISEMENTS •

The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i.e., help wanted, machinery or supplies for sale—the rate is $6.25 per column inch or less per insertion.

WANTED: Young technically trained man with practical experience and proven ability in dyeing and finishing supervision. Write Box 814.

WANTED: Someone with technical training and experience in finishing, preferably synthetic cloth finishing —good opportunity for capable person. Write Box 815.

DYESTUFFS INTERMEDIATES COLORS

PERMANENT POSITION WITH GOOD EARNINGS OFFERED TO THOROUGHLY EXPERIENCED PARTY FAMILIAR USES AND SOURCES OF SUPPLY. LEADING, WELL ESTABLISHED EXPORT HOUSE. EXPORT EXPERIENCE NOT REQUIRED. REPLIES HELD STRICTLY CONFIDENTIAL. BOX 816.

POSITION WANTED: Superintendent of Dyeing—Chemical Engineer — Textile Technician — 20 years' Mill and Laboratory experience. All types Yarns—Skein and Package. Specializing Fast Colors; Double Resist Silk, Acetate, Nylon. Open for responsible position in charge dyehouse or technical sales dyestuffs and chemical specialties. Write Box 817.

WANTED: EXPERIENCED FINISHER....A large textile machine and screen print plant located in the New York area has a position at a high salary for an experienced finisher. Applicant must have thorough knowledge of all finishing processes; the position requires the supervision of all finishing operations, including steaming, washing, finishing, framing and examining of cottons, rayons and crepes. Write Box 818 stating experience; interview arranged at employer's expense.

(Additional Classified's on Page XXXII)

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NYASIL

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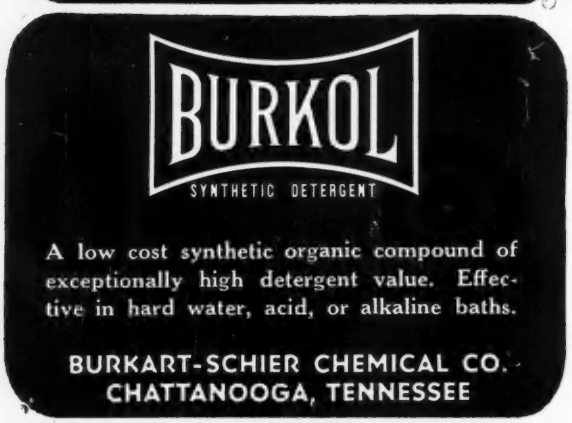
The Alkapens . . . Penetrants for Dry Mercerizing . . . Wetting Agents Applied Directly in the Mercerizing Bath . . . For Yarns and Piece Goods.
BURKART-SCHIER CHEMICAL CO.
CHATTANOOGA, TENNESSEE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Creamsol . . . concentrated stearic Softener . . . Ideal for Bleached Goods but an excellent all-around Softener . . . Imparts Soft, Pleasing Handle.
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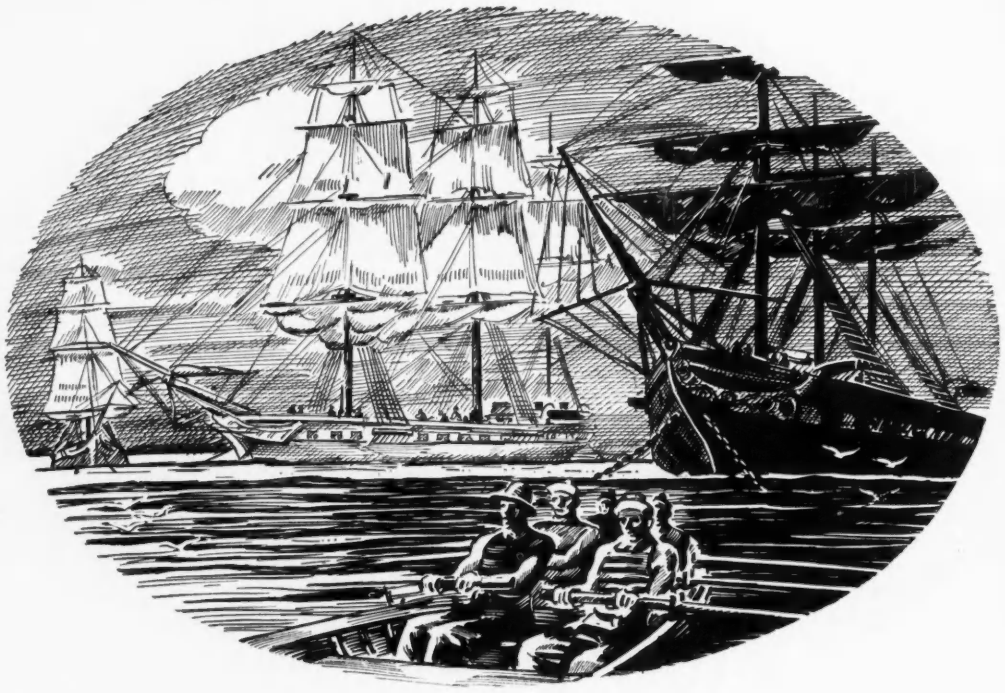

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